U.S. Army Corps of Engineers, Kansas City District

Appendices

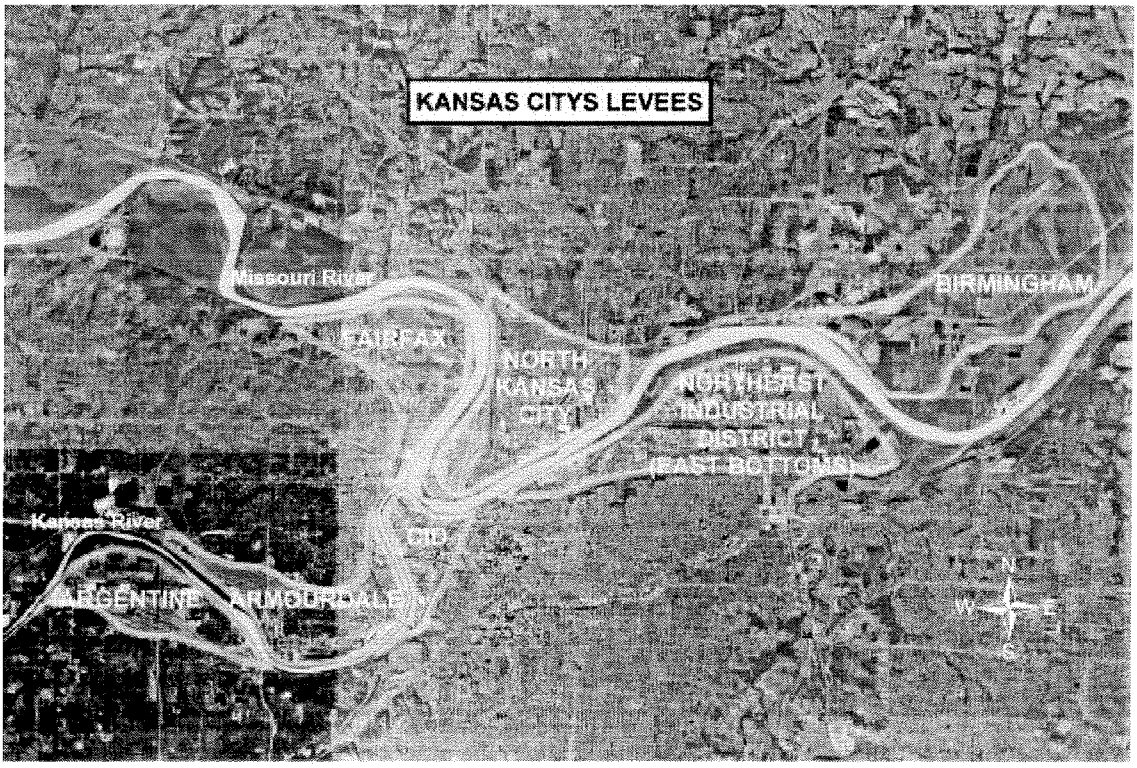
Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement

U.S. Army Corps of Engineers, Kansas City District

Appendix A

Kansas Citys Levees Feasibility Study Website

Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement



Aerial Photograph of the Kansas Citys Levees
(Click on the picture for more information about the levees)

NEWS

Scoping Comments and Responses
January 30, 2004
(Adobe PDF - 54 KB)

Kansas Citys Levees Public Information/Scoping Meeting
Held August 20, 2003

Click to download the meeting slides
(Adobe PDF- 5.8MB)

Welcome to the web site for the Kansas Citys Levees feasibility study. This feasibility study will review the performance of the existing levee system and examine various alternatives for increasing the level of performance. This web site contains both general background and updates regarding the progress of the study.

If you are interested in current levee operations, please visit the Kansas City District Local Protection web pages:

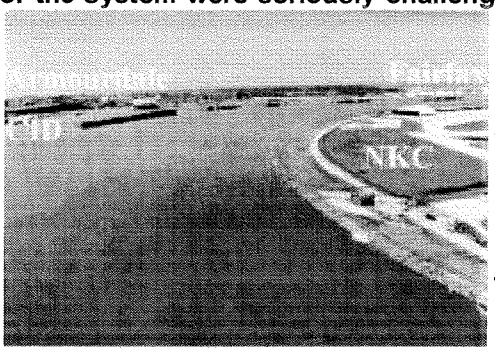
http://www.nwk.usace.army.mil/local_protection/levees.html

Introduction

Click on a picture for a larger view and description

Purpose and Background. **This study is to update and verify data on the level of flood protection provided by the Kansas Citys, Missouri and Kansas, Local Flood Protection Project. This study determines whether one or more plans for increasing the level of flood protection is likely to be technically viable, economically feasible and environmentally acceptable.**

The entire system of seven levee units withstood the Flood of 1993, but some elements of the system were seriously challenged as the flood crest reached near overtopping



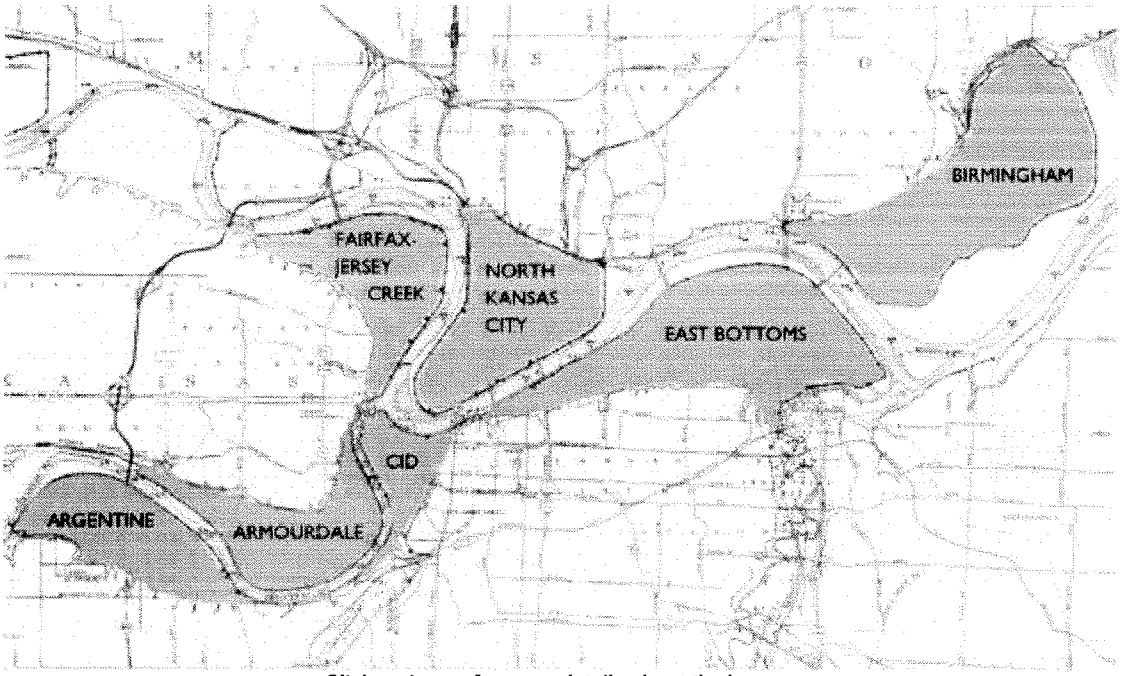
levels for at least one location. This flood experience raised a concern that the levees may provide less than the level of protection for which they were designed. Following the Flood of 1993, both Kansas City, Kansas, and Kansas City, Missouri, wrote letters to the Kansas City District Corps of Engineers expressing concern for the adequacy of parts of the flood damage reduction system.

Authority. **Section 216 of the 1970 Flood Control Act provides authority to reexamine completed civil works. Section 216 reads as follows:**

The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects, the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying structures or their operation, and for improving the quality of the environment in the overall public interest.

Location

The existing Kansas Citys, Missouri and Kansas, North Kansas City, and Birmingham local protection project consists of seven levee units along both banks of the Missouri and Kansas Rivers in the Kansas City Metropolitan area .

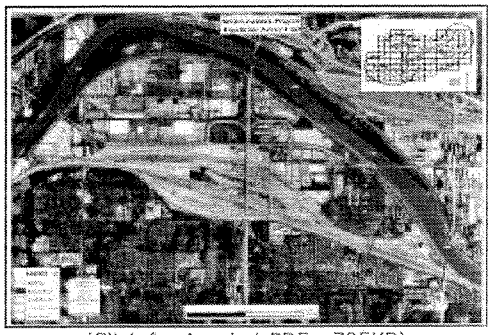


Click on image for more details about the levees.

The Seven Levees

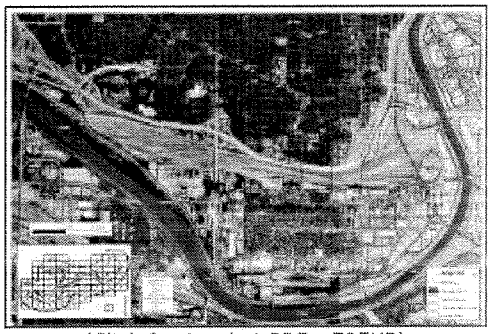
Kansas Citys Levee Units

Map Documents Require Adobe Acrobat Reader.
Click Here to get Acrobat Reader



(Click for Acrobat PDF - 705KB)

Argentine Levee Unit
(Click for Narrative)



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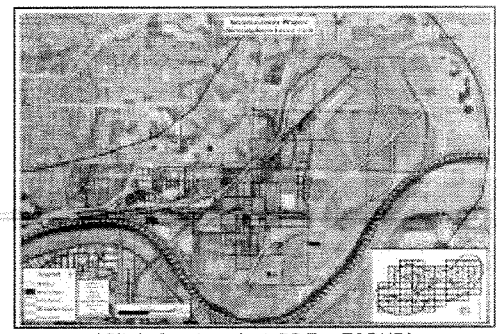
Armourdale Levee Unit
(Click for Narrative)



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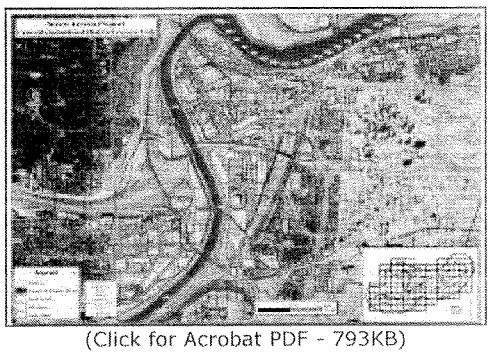
Birmingham Levee Unit
(Click for Narrative)



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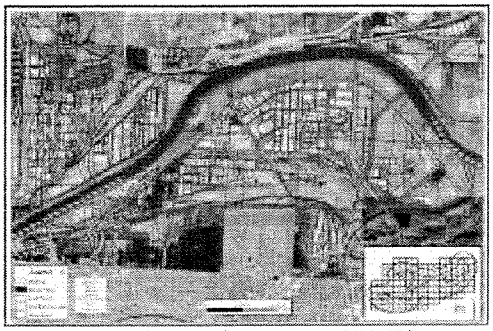
CID Levee Unit
(Click for Narrative)



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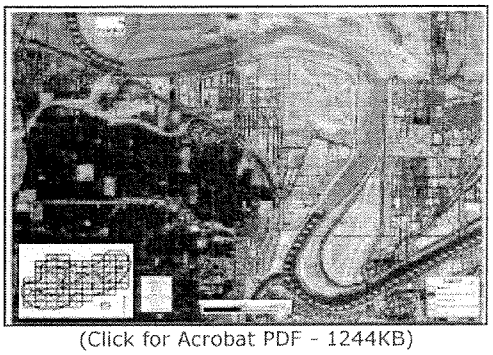
Northeast Industrial District (East Bottoms Levee Unit)
(Click for Narrative)



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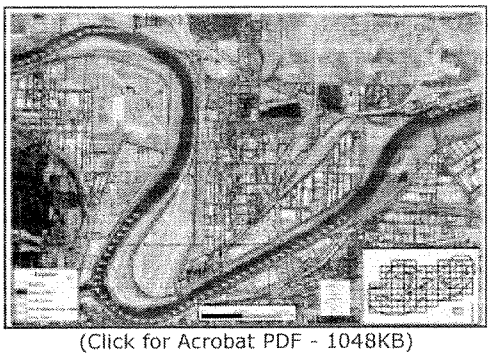
Fairfax-Jersey Creek Levee Unit
(Click for Narrative)



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North Kansas City Levee Unit
(Click for Narrative)

Sponsorship

Sponsorship of the Kansas Citys Levees Feasibility Study is dispersed among four local sponsoring organizations as indicated.

Kansas Citys Levees Feasibility Study Sponsors	
Central Industrial District (Missouri & Kansas)	City of Kansas City, Missouri Kaw Valley Drainage District
Armourdale	Kaw Valley Drainage District
Argentine	Kaw Valley Drainage District
Birmingham	City of Kansas City, Missouri for the Birmingham Drainage District
North Kansas City	North Kansas City Levee District City of Kansas City, Missouri
Fairfax-Jersey Creek	Fairfax Drainage District (Operation and Maintenance of the Fairfax portion) Kaw Valley Drainage District (Operation and Maintenance of the Lower Jersey Creek area)
Northeast Industrial District (East Bottoms)	City of Kansas City, Missouri

Project Status

Completed Actions

- **Reconnaissance Report, August 1999.**
- **Notice of Intent to Prepare an Environmental Impact Statement, Federal Register, January 10, 2001.**
- **Initial Pubic Information Meeting, June 6, 2001.**
- **Public Information/Scoping Meeting August 20, 2003**

Pending Actions*

- **Release of Draft Feasibility Study and Draft Environmental Impact Statement.**
- **Public Meeting on Draft Feasibility Study and Draft Environmental Impact Statement (approx. 2 weeks after release of draft reports).**
- **Public Review of Draft Feasibility Study and Draft Environmental Impact Statement (45 days).**
- **Release of Final Feasibility Study and Final Environmental Impact Statement.**
- **Public Review of Final Feasibility Study and Final Environmental Impact Statement (30 days).**
- **Record of Decision.**

* For further information concerning the status of all pending actions, watch this webpage.

Economic Survey

The economic analyses will assist in determining whether there is a Federal interest in increasing the protection for any of the units in the system. The Federal objective of water and related land resources planning is to contribute to national economic development (NED) consistent with protecting the Nation's environment. Contributions to national economic development are the direct net benefits that accrue in the project study area and the rest of the Nation as a result of the project. Benefit-cost analysis is an evaluation technique used in evaluating alternative government investments. The best alternative project may be defined economically as the plan that returns the greatest excess of benefits over costs. Thus the NED plan is the plan that reasonably maximizes net economic benefits (total benefits less total costs) consistent with protecting the Nation's environment.

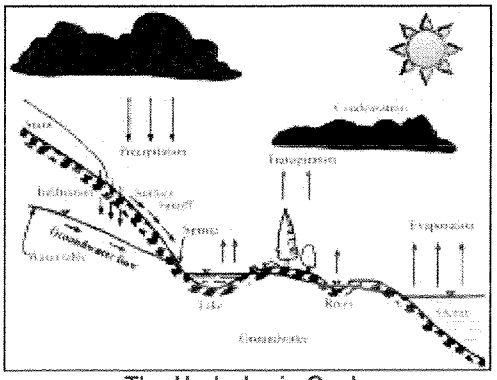
For the areas protected by each of the existing levee units, data on the existing level of investment and the damage susceptibility of that investment will be identified, categorized, and developed. The economic analyses will determine under current conditions and level of protection whether the remaining annual damages to study area investment are high enough to warrant a levee raise for any of the units in the system. Although there may be a low probability of occurrence, if overtopping or other failure occurs, there would be major losses in these highly developed protected areas. Any damages or losses prevented by a project are claimed as project benefits and could result in a benefit cost-ratio that would support a levee raise.

Economics work for the Kansas Citys Levee Feasibility Study includes:

- **Economic field surveys to determine the extent, dollar value, and susceptibility to flood damage of properties within the protected areas.**
- **Calculation of equivalent annual damages and benefits associated with the existing project condition and with various potential improvements.**
- **Comparison of benefits and costs of alternatives, and optimization of the various alternatives to determine the National Economic Development (NED) Plan.**
- **Assessment of interior drainage and how it may affect protected areas.**

Technical Overview

Hydrology and Hydraulics



The Hydrologic Cycle

(Click for larger image)

Hydrologic engineering is a critical technical element in the planning of flood damage reduction measures and actions. It is a civil engineering discipline involving the analysis of water and its systems as it moves above, on, through, and beneath the surface of the earth as defined by the hydrologic cycle.

Hydrology normally encompasses the development of surface water runoff, hydrograph combination, and routing to determine peak discharges at all key locations. Hydraulic analysis for flood damage reduction studies utilizes these discharges to determine the peak water surface elevation. How often the flood occurs (frequency) must then be determined.

Hydrologic engineers have a major participatory role in defining the flood hazard, locating and sizing flood damage reduction projects, and determining and assuring the functional and operational integrity of the project. Hydrologic engineers utilize data such as precipitation and streamflow in the planning, design, and operation of projects. Analysis techniques focus on determining the magnitude and frequency of hydrologic events (precipitation and streamflow) at locations of interest. The analysis approaches generally involve relating known measurements of these phenomena to study areas having little or no measured data. The techniques used include: information transfer, simplified methods, statistical computations, and computer program models of the hydrologic systems.

The objective of the hydraulic analysis is to evaluate the level of protection the Kansas Citys Levee system provides along both the Kansas and Missouri Rivers and will include:

- **Calculation of rainfall/runoff relationships to determine how much water comes down the rivers.**
- **Calculation of how high the water gets under CURRENT CONDITIONS.**
- **Calculation of how high the water gets under a variety of potential FUTURE CONDITIONS.**
- **Assessment of interior drainage, and how it may affect protected areas.**

Technical Overview

Geotechnical

Geotechnical investigations are performed to evaluate those geologic, seismologic, and soils conditions that affect the safety, cost effectiveness, design, and execution of a proposed engineering project.

Actively gathering and analyzing geotechnical data for levee and embankment stability and levee underseepage determine the risk factor pertinent to design, construction schedules, use of borrow material, and environmental requirements.

Geotechnical work for the Kansas Citys Levees Feasibility Study include:

- **Stability of embankment and levee.**
- **Calculation of levee underseepage at various flood stages.**
- **Subsurface investigations to define the existing conditions.**
- **Recommendations for potential improvements, based upon local soil conditions.**
- **Assessment of the risk and uncertainty associated with local soil conditions.**

NEPA

NEPA stands for the National Environmental Policy Act of 1969, as amended. (42 U.S.C. §§4321-4347)

NEPA requires Federal agencies, like the Corps, to consider the environmental consequences of an action equally with economics and technical factors during project planning and prior to decision-making.

Two documents prepared for Public and Agency review:

- **Feasibility Study**
- **Environmental Impact Statement**

In addition, NEPA requires Federal agencies to take measures that protect, restore, and enhance the quality of the human environment, i.e. the natural and physical environment and the relationship of people with that environment.

The NEPA process provides the decision-maker with a comparison of environmental impacts resulting from alternative actions.

Important NEPA Concepts:

- **Public participation and input**
- **Systematic, interdisciplinary study approach (biologists, economists, archaeologists, engineers, and many other disciplines will contribute to the study)**
- **Full disclosure**

Public participation will be solicited through an initial public meeting in the Kansas City area, a 45-day comment period on the Draft Environmental Impact Statement (DEIS), another public meeting approximately 2 weeks into the DEIS comment period, and a final 30-day comment period after issuance of the Final Environmental Impact Statement.

In order to encourage public participation in the NEPA process and ensure full public disclosure, the Corps will utilize this website to provide information to the public on the proposed study and the study process. In addition, the Corps will also provide news releases on project milestones, meeting announcements and comment deadlines to media sources in the project area.

Another important NEPA aspect is participation in the study process by other agencies, including city, county, state and Federal. The Corps has made initial contact with these groups to identify areas of concern and solicit their input in the study process.

Environmental Impact Statement

The Corps study is comprised of the Feasibility Report and the Environmental Impact Statement. The Environmental Impact Statement (EIS) assesses major Federal Actions expected to have significant impacts on the quality of the human environment. The Corps will complete this process to ensure compliance with the National Environmental Policy Act of 1969, as amended.

The EIS will describe: the need for and objectives of the project; a description of alternatives that may meet this need; a description of the affected environment; and a description of potential impacts associated with the various alternatives on the significant resources of the study area

The EIS will also include the public and agency input and address how this information was considered.

The EIS process includes:

- **Initial Public and Agency Input/Involvement (scoping)**
- **Draft Feasibility Report and Draft Environmental Impact Statement (DFR/DEIS)**
- **45 Day Comment Period & Public Meeting on DFR/DEIS**
- **Final Feasibility Report and Final Environmental Impact Statement (FFR/FEIS)**
- **30 Day Comment Period on FFR/FEIS**
- **Record of Decision (ROD)**

Resources that may be considered under various alternatives in the EIS may include: economics; recreation; fish & wildlife; water supply; navigation; flood control; transportation; wetlands; water quality; agricultural activity; cultural resources; threatened & endangered species; esthetics; human safety: public service; land use; vegetation; and other appropriate factors.

When released, the draft and final versions of the Feasibility Report and Environmental Impact Statement will be available for public review/comment on this website, at the Corps' office and at public facilities in the project area. In addition, hard copies of these documents can be requested from our office.

The EIS will provide all those interested in the proposed Federal Action with full access to all information on the existing resources and potential impacts of the proposed alternatives on those resources. This will ensure full disclosure of all information used by the Corps to formulate the recommended action.

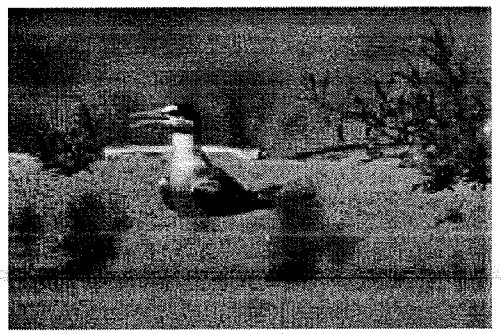
Threatened and Endangered Species

The Endangered Species Act of 1973, as amended, is a Federal Law that was enacted to protect endangered and threatened species and their habitat.

The Corps, as a Federal agency, is required by Section 7 of the Endangered Species Act (16 USC 1536) to use our existing authorities to conserve Federally listed threatened and endangered species and, in consultation with the U.S. Fish and Wildlife Service, to ensure that our actions do not jeopardize listed species or destroy or adversely modify critical habitat.

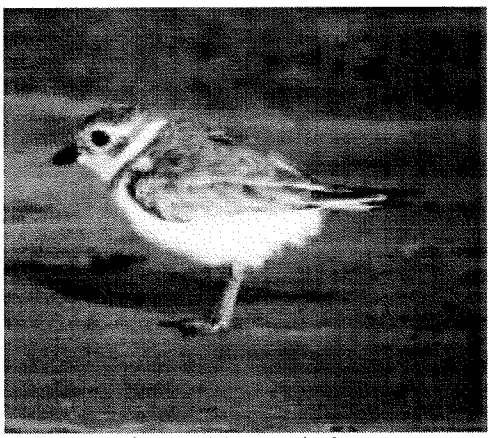
Five Federally listed threatened or endangered species are known to occur on the Kansas and Missouri Rivers. These include: the Federally listed endangered interior least tern (*Sterna antillarum*); the Federally listed threatened piping plover (*Charadrius melodus*); the Federally listed threatened bald eagle (*Haliaeetus leucocephalus*); the Federally listed endangered Indiana bat (*Myotis sodalis*); and the Federally listed endangered pallid sturgeon (*Scaphirhynchus albus*). The U.S. Fish and Wildlife Service has NOT identified any critical habitat on the Kansas or Missouri Rivers for these listed species.

Credit for Photographs:
U.S. Fish and Wildlife Service.
Click on photo for larger image.



Sterna antillarum

Federally listed endangered:
Interior Least Tern



Charadrius melodus

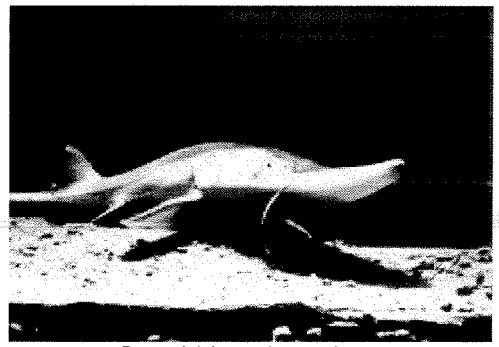
Federally listed threatened:
Piping Plover

Haliaeetus leucocephalus

Federally listed threatened:
Bald Eagle

Myotis sodalis

Federally listed endangered:
Indiana Bat



Scaphirhynchus albus

Federally listed endangered:
Pallid Sturgeon

The Corps will consult with the U.S. Fish and Wildlife Service to determine potential effects the alternatives being considered in the Feasibility Report and Environmental Impact Statement could have on the Federally listed species.

The Corps and the U.S. Fish and Wildlife Service will consult on the alternatives described in the EIS to ensure that the proposed action does not jeopardize the continued existence of these listed species and avoids adverse impacts to them and their habitat.

Public Involvement

Public involvement in this study is essential to the development of a recommended action that is supported by the community and addresses the needs and concerns of the numerous stakeholders in the project area. As part of the overall study process, the Corps will actively solicit input from numerous Federal, State and local agencies, businesses, and organizations. In addition, individuals will be provided opportunities to provide input to the study during the Public Information/Scoping Meeting, during the 45-day comment period on the Draft Feasibility Report/Draft Environmental Impact Statement, at the Public Meeting on the Draft Feasibility Report/Draft Environmental Impact Statement, and during the 30-day comment period on the Final Feasibility Report/Final Environmental Impact Statement.

Scoping Comments and Responses
January 30, 2004
(Adobe PDF - 54 KB)

Kansas Citys Levees Public Information/Scoping Meeting
Held August 20, 2003

Click to download meeting slides
(Adobe PDF- 5.8MB)

When the Draft Feasibility Report/Draft Environmental Impact Statement are released to the public a Notice of Availability will appear in the Federal Register. In addition, the Corps will mail notices to individuals on the project mailing list (click here to get on the project mailing list), circulate a press release and announce the release of the draft reports on this website. The draft reports will be available for public review on this website, at area public libraries and at the Corps office. The comment period on the draft reports will run for 45 days after the Notice of Availability appears in the Federal Register. Approximately 2 weeks into the 45-day comment period the Corps will hold a public meeting to present information on the Draft Feasibility Report/Draft Environmental Impact Statement and to receive comments from the public. All substantive comments received during this period will be included and addressed in the Final Feasibility Report/Final Environmental Impact Statement.

When the Final Feasibility Report/Final Environmental Impact Statement are released to the public a Notice of Availability will appear in the Federal Register. In addition, the Corps will mail notices to individuals on the project mailing list (click here to get on the project mailing list), circulate a press release and announce the release of the final reports on this website. The final reports will be available for public review on this website, at area public libraries and at the Corps office. The comment period on the final reports will run for 30 days after the Notice of Availability appears in the Federal Register. All substantive comments received during this period will be included and addressed in the Record of Decision.

At the close of the 30-day comment period on the Final Feasibility Report/Final Environmental Impact Statement the Corps will prepare a Record of Decision. The Record of Decision will state the alternatives and factors that were considered, and what the Corps' decision is. When the Record of Decision is approved, it will be available for viewing on this website. In addition, the Corps will mail notices to individuals on the project mailing list (click here to get on the project mailing list), circulate a press release and announce the approval of the Record of Decision on this

website.

As stated above, public participation in the study process is critical for the successful completion of the project. The public involvement process for this project is your opportunity to learn about the project and provide information that will contribute to the Corps' final decision.

Contact

Mail to:

US Army Corps of Engineers
Kansas Citys Levees Feasibility Study
Public Involvement Workgroup
ATTN: CENWK-PM-PR
601 East 12 Street
Kansas City MO 64106

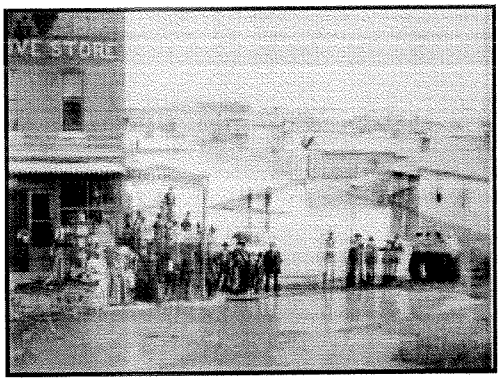
Email:

Public Involvement Workgroup, Kansas City District

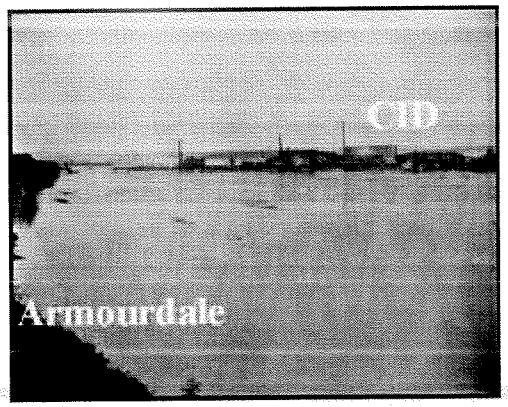
Flood Photos

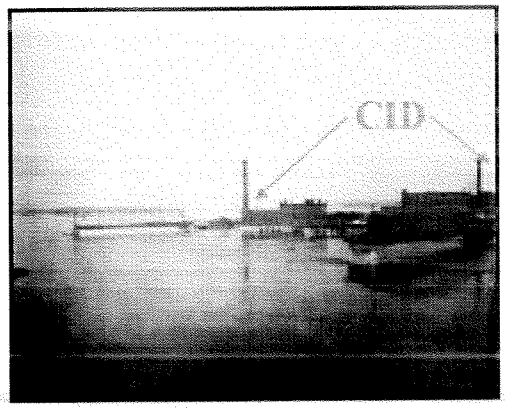
Credit for Historic Photographs:
Special Collections, Kansas City Public Library, Kansas City, Missouri.
Click on photo for larger image.

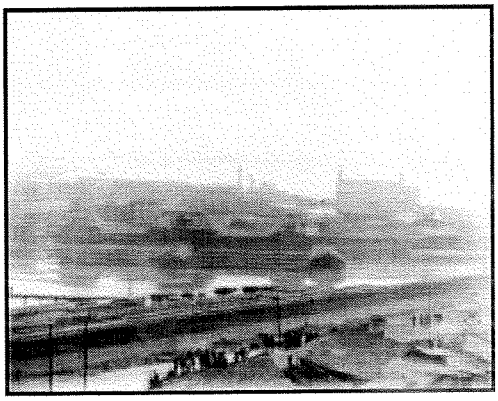
1881 Flood



1903 Flood

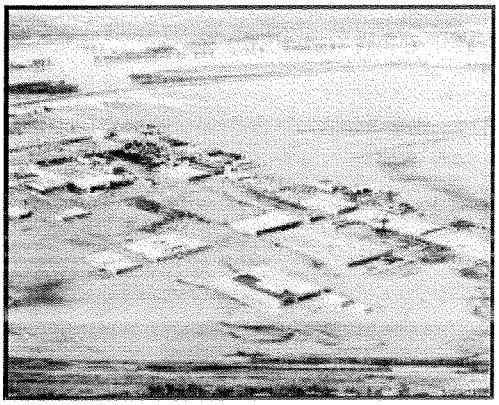




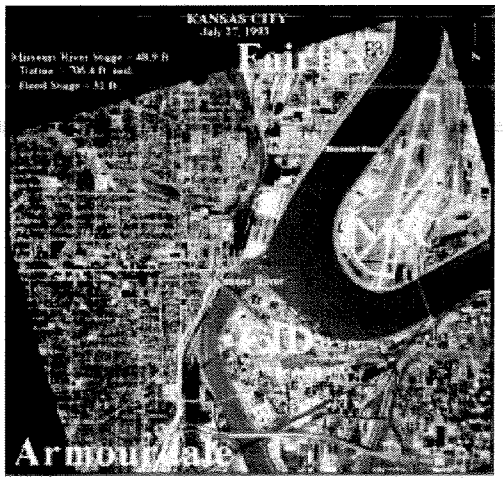


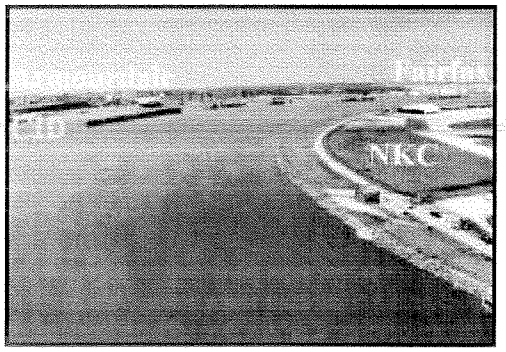
1908 Flood

1951 Flood



1993 Flood





Historical Flood Events

Flood Stages in the Kansas Citys area have been exceed by at least a foot

TWENTY EIGHT TIMES

from 1844 to 1941.

Major Flood Events

Year	Feet Above Flood Stage
1844	17.0
1881	6.8
1903	14.0
1908	9.3

Five Largest Annual Peaks - Missouri River

Floods on the Missouri River are caused by widespread storm systems over several days or weeks, sometimes combined with runoff of spring snowmelt in Wyoming, Montana, and the Dakotas.

Year	Discharge (Cubic Foot/Second)
1951	573,000
1903	543,000 (est.)
1993	541,000
1908	402,000 (est.)
1952	400,000

The five largest annual peaks at the United States Geological Survey (USGS) gauge on the Hannibal Bridge in Kansas City. The period of record for stage data at this gauge is from 1873 to the present. The period of record for flow data at this gauge is from 1929 to present.

Five Largest Annual Peaks - Kansas River

Major floods on the Kansas River are usually caused by a series of short-duration, high intensity storms following a prolonged period of general rains which reduces the infiltration capacity of the soil to a minimum and causes a greater than normal flow in the stream channels.

Year	Discharge (Cubic Foot/Second)
1951	469,000
1903	300,000 (est.)
1908	200,000
1993	170,000
1935	154,000

The five largest annual peaks at the United States Geological Survey (USGS) gauge on the Kansas River at Topeka, Kansas. The period of record for this gauge is from 1904 to the present, though intermittent and anecdotal information is available from 1869. The USGS gauge (06889000) is located on the Sardou Bridge, river mile 83.1, located 2.3 miles upstream of Soldier Creek.

U.S. Army Corps of Engineers, Kansas City District

Appendix B

SCOPING COMMENTS

Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Field Office
315 Houston Street, Suite E
Manhattan, Kansas 66502-6172

September 11, 2003

Mr. John G. Grothaus
Acting Chief, Planning Branch
Plan Formulation Section
Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

Dear Mr. Grothaus:

This is in response to the August 7, 2003 request for comments expressed during the Agency Information and Public meeting for the Kansas Cities, Kansas and Missouri Flood Protection Project feasibility study. The U.S. Fish and Wildlife Service (Service) provided a Planning Aid Letter dated July 12, 1999 to Mr. Micheal G. Trail, Deputy for Project Management regarding this project. Our letter focused on fish and wildlife resource needs, opportunities and impacts associated with alternatives for the Kansas Cities, Flood Protection Project, as envisioned in 1999.

Information provided at the August 7, 2003 meeting indicates a new alternative (not previously addressed in 1999) will be explored for possible implementation. The new alternative will explore increasing the channel capacity of the lower Kansas River which will entail channel and bank line modifications. Our assumption is that approximately 10 miles of the lower Kansas River is being considered for dredging and/or bank line modification to increase the carrying capacity of the lower Kansas River starting at its' confluence with the Missouri River. This alternative did not exist in 1999 and has not been previously addressed by the Service or other resource agencies. Our comments on this new alternative are as follows:

The purpose of this channelization alternative is to increase the capacity of the lower Kansas River to carry off flood water by enlarging the cross-sectional area (deepening) and smoothing the channel. Clearing all woodland riverward of the levees is designed to increase flow velocity.

Channelization of the lower Kansas River would have significant adverse impacts on fish and wildlife resources. Channelization will result in a quantitative reduction in aquatic habitat,

decrease aquatic habitat diversity, and increase sediment loading in the area channelized. Major impacts will occur from loss of substrate, removal of snags, detritis, loss of instream vegetation, loss of streamside vegetation, disruption of the run-pool sequence, and potential dewatering of adjacent areas. It is also expected that these adverse impacts will affect downstream Missouri River areas. The initial and secondary impacts of the removal of riparian vegetation associated with channelization will be devastating to wildlife populations which will be eliminated. Major impacts to reptiles, amphibians, mammals, and birds include loss of cover (for reproduction or escape) loss of food, species composition changes, decreased diversity, decreased density and numbers, and increased susceptibility to predators. Overall, this alternative would significantly damage fish and wildlife resources and their habitat.

We assume this alternative would eliminate the island, and vegetation on the island, located mid-channel near the eastern end of the Argentine levee. Please be aware that all islands on the Kansas River are the property of the State of Kansas and are held in thrust for the people by the Kansas Department of Wildlife and Parks (Department). Any alternative that would adversely affect the island or the variety of shallow water habitats associated with the island would have to be closely coordinated with the Department.

The shallow sand substrate of the Kansas River is much more conducive to some native fish that the fast, deep Missouri. Missouri River fishes enter the Kansas River when Missouri River back water provides refuge from high swift turbid flows of the channelized navigation channel of the mainstem. Shovel nose sturgeon are known to seek out these calmer waters, particularly during winter. The pallid sturgeon (Scaphirhynchus albus) is a moderately large bottom-dwelling fish which may occur in low numbers in portions of the Missouri River and lower Kansas River, below Lawrence. It is believed to require sandbars, chutes, and backwater areas for reproduction and is federally listed as endangered. Channelizing the lower Kansas River will likely result in a "may adversely affect" determination for the pallid sturgeon, thereby requiring formal consultation pursuant to section 7 of the Endangered Species Act.

In compliance with the requirements of Section 7 (c) of the Act, a Biological Opinion on the Operation of the Missouri River Mainstem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project and the Operation of the Kansas River Reservoir System was issued by the Service in November of 2000. It is the Service's biological opinion that the Corp's proposed continued operation of the system and the cumulative effects, are likely to jeopardize the continued existence of the least tern, piping plover, and the pallid sturgeon, but not likely to jeopardize the continued existence of the bald eagle. The jeopardy opinion is still in effect for the Kansas River System. Additional adverse impacts to pallid sturgeon habitat at the mouth of the Kansas River would be problematic.

In 1980 potential recreation sites adjacent to the Kansas River were identified by the Heritage Conservation and Recreation Service (now the Park Service) as an element of the Kansas River Bank Stabilization Study. The plan proposes that the reach of the Kansas River beginning at its confluence with the Deleware River downstream to Interstate Highway 635 Bridge Crossing, a distance of 57 miles, be designated as a component of the National Wild and Scenic River System. The Plan proposed fee acquisition of 18 acres and easements on between 14 and

98 acres of land on the right bank of the river between the 635 bridge and Turner Bridge. This site was to become the downstream terminus or take out point for the recreational river segment. The western half of the Argentine Unit on the Kansas River encompasses this site. Any effort to modify or channelize the river in this area must be closely coordinated with the National Park Service.

The adverse affects to fish and wildlife and recreation from implementation of this alterative should be avoided by discarding it from further evaluation. Increasing the height of existing levees along the lower Kansas River will eliminate the need for removing large amounts of vegetation from stream banks and avoid the expense of maintenance required on channels dredged through noncohesive (sand substrate) materials.

Thank you for the opportunity to comment once again on this project. If we can be of any assistance please call Mr. Dewey Caster, of my staff, at 785 539-3474 ext. 108.

Sincerely,

William H. Gill

William H. Gill
Field Supervisor

cc: Kansas Department of Wildlife and Parks, Environmental Services, Pratt, Kansas
U.S. Fish and Wildlife Service, ES, Columbia, Missouri
National Park Service, Omaha, Nebraska

WHG\drc

600 Broadway, Suite 300
Kansas City, Missouri 64105-1554

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MARC
Mid-America Regional Council

September 17, 2003

Mr. Scott W. Gard
CENWK-PM-PF
U.S. Army Corps of Engineers
Kansas City District
601 East 12th Street
Kansas City, MO 64106-2896
Kclevees@nwk02.usace.army.mil

Dear Mr. Gard:

I enjoyed attending the Scoping Meeting for the Kansas City Levees Study at the Army Corps of Engineers' offices on August 7, 2003. We look forward to working with you on this exciting project to ensure project outcomes that meet federal, state and local needs alike. This letter is a follow-up to our letter from June 6, 2001 and summarizes additional key comments from the Mid-America Regional Council pertaining to the proposed project scope.

1. Recreational trails on levees. The Mid-America Regional Council (MARC), in association with local governments and civic partners throughout the region, developed a metrowide greenways trails plan for the Kansas City region called MetroGreen. This plan calls for the development of over 1,100 miles of trails throughout the region in the coming generation. Key elements of this plan call for the creation of 240 miles of recreational trail atop the levee systems along the Kansas and Missouri Rivers. MARC encourages the Corps to include consideration of public access of levees and use of maintenance roads as trails. We would request your agency be supportive of considering this concept when discussing it with local levee districts in our region.

   Ample precedents for this work may be found within other Corps districts such as the Louisville District, the St. Paul District, the Jacksonville District, the New Orleans District, Omaha District and the St. Louis District. Some examples within the midwest region that have been incorporating recreational trails along the levees are listed below.

   - Manhattan, Kansas – Currently has 5 miles of levee top recreational trail as a part of 9-10 mile trail corridor that was developed in the 1980's. The trail system is owned by the City of Manhattan and operated by the Manhattan Parks and Recreation Department.
   - Lawrence, Kansas – Currently has 10 miles of levee top recreational trail of which approximately 5 miles runs through the downtown area. The trail also has three boat access points to the river and some parts of the levee are used for accessing agricultural property for farming purposes. The trail system is owned by the City of Lawrence and maintained by Public Works Department.

- Papio- Missouri Natural Resource District, Nebraska – Currently has about 50 miles of recreational trail along levees around Omaha that includes the Missouri River and some small tributaries. The Natural Resource District is responsible for the day-to-day maintenance and operation of these trails.

As a part of our efforts here at MARC to implement the MetroGreen system we have been in contact with these organizations. We have gathered agreements that address recreational trail easements along levee tops, operations and maintenance and liability concerns that we would be happy to share with you. We would like to discuss with you the possibilities of organizing a tour of levee trail projects for the benefit of our local levee districts and public officials.

2. Environmental Sustainability & Corps Environmental Operating Principles. As you know, in March 2002, Lt. General Robert Flowers announced the U.S. Army Corps of Engineers Environmental Operating Principles to guide the Corps in all of its works. These principles articulate strong support for designing and constructing environmentally sustainable projects.

   Use of these principles to define the scope of the this project might have several interesting implications. The broadest, however, would suggest that the project scope itself seek opportunities to enhance and restore environmental conditions wherever possible, rather than restricting the scope to mitigating negative impacts.

3. Restoration sites and regional planning. MARC, in association with a broad range of federal, state and local partners (including the Corps) is working to develop a regional natural resources inventory. This GIS-based initiative will seek to identify critical natural areas, natural resource conservation needs and environmental restoration opportunities. Opportunities to restore environmental conditions on some of these sites identified through this initiative should be seriously evaluated as project alternatives are developed.

I thank you for your consideration of our interests, and would be more than happy to discuss these and other issues with you in greater detail at any time. Please let me know if we can be of any assistance to you to help in the successful completion of this exciting initiative.

Sincerely,

Tom Jacobs
Manager, Environmental Programs

Mid-America Regional Council

MARC, 600 Broadway, 300 Rivergate Center, Kansas City, MO 64105-1554

FAX

Date: **09/17/03**

Number of pages including cover sheet: 3

To:

Scott W. Gard

U.S. Army Corps of Engineers

Phone:

Fax phone: 816-426-2142

CC:

From:

Steven Rhoades

Phone: 816/474-4240

Fax phone: 816/421-7758

REMARKS: ☐ Urgent ☐ For your review ☐ Reply ASAP ☐ Please comment

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Mid-Arne

September 17, 2003
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Kansas City, MO 64106-2896
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Sincerely,

Tom Jacobs
Manager, Environmental Programs

KSR&C No. C3·07·252

KANSAS

Kansas State Historical Society
Dick Pankratz, *Director, Cultural Resources Divison*

KATHLEEN SEBELIUS, GOVERNOR

August 18, 2003 gop 9/15

John Grothaus
Planning Branch
Department of the Army
Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, MO 64106-2896

RE: Flood Protection Project Study, Kansas City Metropolitan Area
Wyandotte County

Dear Mr. Grothaus:

Thank you for providing information regarding the flood protection study for the Kansas City metropolitan area. In accordance with 36 CFR 800 the Kansas State Historic Preservation Office has reviewed its cultural resources files for the areas of the above referenced project located in Kansas. At this time, we have no particular areas of concern although a number of historic trail routes and farmstead locations are recorded within these areas on historical maps. Although we have not identified any known archeological sites or historic structures within the areas identified, we would like the opportunity to review any future construction projects proposed in these areas as a result of the study.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ex. 214) or Jennifer Epperson (ex. 225). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Mary R. Allman
State Historic Preservation Officer

Richard Pankratz

Richard Pankratz, Director
Cultural Resources Division

RDP/jee

SCOPING COMMENTS AND RESPONSES

FEASIBILILTY STUDY/ENVIRONMENTAL IMPACT STATEMENT
FLOOD DAMAGE REDUCTION
IN THE KANSAS CITYS, MISSOURI AND KANSAS METROPOLITAN AREA
January 30, 2004

1. Hike/bike trails on levees and increased riverfront access

Because there were a number of comments regarding trails on levees, all the comments have been listed below followed by a general response to this issue.

Comments:

1.1 Comment: I want everybody to know there is a high level of interest in Clay County to incorporate trails in the County and one of the areas we recognize in the Northland Trails Plan, and I have copies of that here, were the levees along the Missouri River. ... We think that possibly the levee may be another source of land where we do not need to go to numerous owners for acquisition. ... I am here tonight representing the Commission to see if there is a level of interest and if there is with the Clay County Levee Districts we would like to pursue this and if there isn't just tell us and we will look someplace else. ... We think it might help increase security around the levee, it might help increase public support for the levees, increase political support for the levees and also help improve the quality of life for Clay County Citizens. So if you are interested in taking any of this information I will be glad to leave it for you and I would also be glad to discuss this with you after the meeting. Craig Porter, Clay County Commissioner, Clay County Missouri, verbal at August 20, 2003 Public Scoping Meeting

1.2 Comment: I think that primarily I need to address the Riverfront Heritage Trail and its relationship to the CID (Central Industrial District) and more specifically the Kaw Valley Drainage District. I brought with me several copies of the maps of the Riverfront Heritage Trail. I don't know if any of you are familiar or at this point unfamiliar with the Heritage Trail but it's a multiuse trail that will unify the riverfront with the city market area and eventually extend as far south as the Kemper Arena Area. There are some segments of the trail as outlined in this map that of course run along the levees of the Kaw Valley Drainage District ... The perception is that the riverfront has been sequestered and it is no longer really accessible to the public. I personally feel and I believe I can speak with a certain amount of confidence for the Missouri Bicycle Federation that allowing the public to buy-in to those districts, to allow the public to buy-in to those areas in the form of recreation puts the public commitment back into the preservation of those areas. ... I submit and simply put that the best way to ensure the success of flood districts in the future is to make sure that the public buys-in and that can be most efficiently done with recreation. ... I have some copies of the Riverfront Heritage Trail map if you would like them and I thank you for your time. Randy Niere, Unofficial representative of the Missouri Bicycle Federation and the Riverfront Heritage Trail organization, verbal at August 20, 2003 Public Scoping Meeting.

1.3 Comment: We are here to express our support for the concept of recreation on top of the levees and we offer to provide technical assistance or be a resource of information to the Corps, local agencies or levee districts for that purpose. We have a great interest in connecting the public back to our region's important resource which is the river. Steve Rhoades, MidAmerica Regional Council, verbal at August 20, 2003 Public Scoping Meeting

1.4 Comment: I think the levee systems should be open to non-motorized use and trail development. The levees have cut the people off from the rivers. Opening them will help restore that use. I know levees elsewhere are

used for public roads (Mo Bootheel – Memphis Corps District). Bikes and walkers are much less damaging (if they cause any damage) then that. People out there also help watch for and report problems. The levees will make vital links for proposed trail systems, help with bicycle transportation corridors and help get a healthier population by getting exercise. There will also be an effect on tourism dollars. The people need to be reconnected to the river. The use at English Landing Park – one of the few places you can actually get to the river – is an indication of this need. Helene Miller, Liberty Missouri, comment card August 20, 2003 Public Scoping Meeting.

1.5 Comment: A trail system built on the levees and riverfront ways of this system would be a gem of considerable economic and cultural benefit to the Kansas City region. This economic benefit should be considered as an integral part of the project and the economic value of the trails/greenway system should be included in the economic analysis created for the project. Public access to the levee system and the creation of walking/bike trails throughout the system should be an important part of this project. Brent Hugh, Email comment received August 21, 2003.

1.6 Comment: I would like to endorse the idea of using the levy system for trails in the Kansas City area. The Kansas City area has fewer trails than most cities in the USA, and the use of levees could be a big boost to our trail system. Steve Fuller, Email comment received August 29, 2003.

1.7 Comment: Recreational trails on levees. The Mid-America Regional Council (MARC), in association with local governments and civic partners throughout the region, developed a metrowide greenways trails plan for the Kansas City region called MetroGreen. This plan calls for the development of over 1,100 miles of trails throughout the region in the coming generation. Key elements of this plan call for the creation of 240 miles of recreational trail atop the levee systems along the Kansas and Missouri Rivers. MARC encourages the Corps to include consideration of public access of levees and use maintenance roads as trails. We would request your agency be supportive of considering this concept when discussing it with local levee districts in our region. Tom Jacobs, Manager Environmental Programs, MidAmerica Regional Council by letter September 17, 2003.

Response: Several comments were received in relation to the development of recreational hike/bike trails on the existing levee system. These comments ranged from stating that the Corps should encourage or facilitate the development of a recreational hike/bike trail system on the existing levees, to the Corps should itself fund trails on the existing levee system or even require that levee districts construct or allow trails on the existing levee system. In support of trails on the existing levee system several commenters provided examples where hike/bike trails were located on Federal levees. Some commenters noted that locating hike/bike trails on the levees would emphasize Kansas City's tie with the two river systems that have played such a major role in the development of our community. They have also noted that the recreational trail system could actually increase support for, and awareness of, the benefits provided by the existing levee system. Commenters also noted the aesthetic benefits associated with the river and adjacent riparian timber. The following provides further information and clarification on how recreational hike/bike trails will be considered during this study:

1. The Corps is neither a proponent of, nor an opponent to, the incorporation of a recreational trail system into any given levee unit. In addition, the Corps has no authority to require that levee districts construct or allow recreational hike/bike trails on the existing levee system. In Kansas City District, the local sponsors own and operate the Federal levees that the Corps of Engineers constructed. The local sponsors (in some cases drainage districts, in some cases municipalities) pay for the maintenance of those systems. In other parts of the nation, this is not always the case. So, the circumstances of other Federal levee systems are not necessarily analogous to the circumstances in the Kansas City District.

2. The Corps of Engineers does not own the levee units but monitors for compliance the operation and maintenance of the levee system in cooperation with the local levee districts. This oversight is primarily to ensure that the existing levee system will perform as designed during a flood event. The Corps makes annual

inspections of each levee unit and reviews plans submitted by the levee districts for work on or adjacent to the levees. The standards used as basis for this oversight and inspections are contained in the following referenced citations: TITLE 33- NAVIGATION AND NAVIGABLE WATERS, Chapter II – Corps of Engineers, Department of the Army, Part 208 – Flood Control Regulations, MAINTENANCE AND OPERATION OF FLOOD CONTROL WORKS. In summary, Part 208 emphasizes efficient operation and maintenance of levees, floodwalls, drainage structures, gates, valves, floodways, channels, pumping plants, and other flood control facilities. Failure of a levee district to maintain the levee unit in a manner consistent with the operation and maintenance manual or allow modification on or adjacent to the levee without the required engineering review and approval from the Corps could result in that levee unit not being eligible for Federal funds for repairs should it be damaged during a major flood.

3. Currently, within the Kansas City District there are recreational hike/bike trails at the Federal levee units at both Lawrence and Manhattan, Kansas. These trails provide numerous recreational opportunities and both receive fairly high usage and are popular in their communities. However, the levee systems in the Kansas City metropolitan area are in many cases immediately adjacent to intense industrial development, utilities, and transportation infrastructure. In view of heightened security concerns of recent times, there are industrial complexes, key utilities, and transportation lines adjacent to the levee systems that would be sensitive to increased public access. Concerns have been raised by the levee districts regarding the following: liability issues, litter/dumping, trespassing on adjacent landowners, security of businesses, damage or vandalism to levee structures, erosion of the levee embankment, sources of funding for operation and maintenance of the trail, and also conflicts between recreational users and relatively frequent operation and maintenance work on the levees. Also, there is a concern raised by the levee districts that the primary purpose of the levee system would be subordinated by adding another purpose. The Kansas Citys levee system provided significant protection to the economic investment in our community during the Great Flood of 1993. The Kansas City levee system has saved lives, prevented hundreds of millions of dollars in physical damages, and maintained economic and employment opportunities for a large vital portion of the metropolitan area. The levee owners and the constituents they serve remain adamant that the primary reason for the existence of this critical infrastructure must remain a central focus.

4. Funding for the development and long-term viability of a recreational hike/bike trail on a levee unit is a critical consideration. Local trail proponents may decide to fund all such costs locally. Or the possibility of Federal funding can be considered. In a study authorized under Section 216 (this study) a dollar amount up to 10% of the total project cost can be utilized for recreational development. This would include, study, design and construction costs. The costs of this recreational development are shared with the local sponsor on a 50% local and 50% Federal basis. There is currently no authority for the Corps to fund recreational trails on this levee system at 100% Federal costs.

In the current ongoing study, no specific funding for the study of recreational development was identified by the study sponsors. Thus the study budget does not address levee trail implementation directly. Furthermore, the long-term operation and maintenance cost of recreational development are fully the responsibility of the levee district (or the local sponsor for that recreational feature). It is our understanding that funding arrangements for the operation and maintenance costs associated with the implementation of a levee trail system have not been clearly identified by trail proponents in consultation with all the levee districts involved with this study. The development of a bona-fide local financing plan (addressing study, design, construction, operation and maintenance) is a necessary prerequisite for Federal involvement in any proposed trail action.

5. The first step in realistically addressing the development of a recreational hike/bike trail on a levee unit would be for the trail proponent to meet with the officials of the local levee district and discuss in some detail the operation and maintenance requirements of the levee unit. To be successful, this discussion must lead to agreement on the financial responsibility for the operation and maintenance costs associated with trail

implementation. Such discussions should recognize the range and numbers of flood control facilities and access requirements for the specific levee unit. .

Following the initial meetings and subsequent agreements between trail proponents and the levee districts, the individual levee districts must then formally submit to the Corps:

A. A request for technical review of any locally-developed trail plan. The Corps technical oversight review would identify any components of the proposed plan that would not be compatible with operation or maintenance of the levee system in accordance with its primary function to provide protection during major floods, or

B. If the trail implementation plan were to propose Corps funding or Corps involvement in the study, design, or construction of the trails, then the aforementioned local financial responsibility plan must be provided to the Corps for review. The Corps would then determine if the proposed trail implementation could be considered within the authority of the ongoing feasibility study.

6. As part of this Kansas Cities Levees Study, the Corps will consider requests from the levee districts along with any local plans, such as Metrogreen, to ensure that if practicable, any alternative selected to increase the reliability of the existing flood damage reduction system, does not preclude future development of recreation opportunities. The Corps of Engineers is supportive of beneficial and compatible recreation development in the Metropolitan area, including trail systems that interconnect the region. The Corps will continue to work with recreation interests and the levee districts to facilitate better mutual understanding and cooperation where possible.

2. Hydrologic and engineering

2.1 Comment: Will increased flood protection measures within the study area result in increased floodwater elevations immediately downstream of the study area? If so, how are those impacts handled? Jim Shipley, Project Manager MoDOT, comment card August 7, 2003 Scoping Meeting

Response: Hydraulic impacts (effects) upstream, downstream, and through the project reach for the selected alternative will be included in the final report. At this time, effects have not been quantified.

2.2 Comment: The impression I got was that the Kaw was doubtful in any event in the 1951 order of flow. First, what was the estimated peak flow from the Kaw from the flood of 1951 vs what the river is estimated to be able to bear currently? Randy Niere, Email comment received August 22, 2003

Response: The estimated peak discharge on the Kansas River during the 1951 event is 510,000 cubic feet per second (cfs) coincident with 63,000 cfs on the Missouri River above the Kansas River. Therefore, the total flow immediately downstream of the confluence at the Hannibal Bridge was estimated at 573,000 cfs. The capacity of the Kansas River in the study reach is dependent on the assumed discharge on the Missouri River. Results of this analysis will be included in the final report.

2.3 Comment: How likely is the secondary berming, wells and pumping to actually prevent sand boils or physical denigration or migration of the levee itself? Randy Niere, Email comment received August 22, 2003

Response: Under seepage berms on the landside of the levee add weight at the toe to prevent soil particles from piping under the levee from sand-boil activity acting at the landside that could result in failure of the levee. Wells work as pumping, to draw down the excess pressure head. They reduce the pressure head down landward of the toe so risk of failure due to uplift or piping is minimized

2.4 Comment: Has the subsidence effect of scouring and undermining of the sand layer at points like Turkey creek been estimated in this model? Randy Niere, Email comment received August 22, 2003

Response: No.

2.5 Comment: Do the numbers for the Kaw change if the Missouri is concomitantly high, near flood stage? Randy Niere, Email comment received August 22, 2003

Response: See response to comment 2.2 above.

2.6 Comment: At what depth is the sand layer? The bedrock layer at the riverbank? I have physically been down in the banks around James St., and it is a fine sand down there. Is this contiguous with the sand layer in the geodynamics slide? Randy Niere, Email comment received August 22, 2003

Response: This will depend on the slide area you are referring to.

2.7 Comment: Are there any similar models for this kind of flood prevention situation in another urban environment? Randy Niere, Email comment received August 22, 2003.

Response: The Corps of Engineers Hydrologic Engineering Center has developed a state-of-the-art analysis model for formulating and evaluating flood damage reduction plans for both urban and rural areas. The current model is the Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) computer program model that uses a risk-based analysis. The model includes both economic flood damage and hydrologic engineering analyses using a consistent study configuration for streams, damage reaches, plans, and analysis years.

3. Channelization and environmental impact issues

3.1 Comment: Information provided at the August 7, 2003 meeting indicates a new alternative (not previously addressed in 1999) will be explored for possible implementation. The new alternative will explore increasing the channel capacity of the lower Kansa River which will entail channel and bank line modifications.... Channelization of the lower Kansas River would have significant adverse impacts on fish and wildlife resources. Channelization will result in a quantitative reduction in aquatic habitat, decrease aquatic habitat diversity, and increase sediment loading in the area channelized. Major impacts will occur from loss of substrate, removal of snags, detritis, loss of instream vegetation, loss of streamside vegetation, disruption of the run-pool sequence, and potential dewatering of adjacent areas. It is also expected that these adverse impacts will affect downstream Missouri River areas. ... Overall, this alternative would significantly damage fish and wildlife resources and their habitat. ... The adverse affects to fish and wildlife and recreation from implementation of this alternative should be avoided by discarding it from further evaluation. Increasing the height of existing levees along the lower Kansas River will eliminate the need for removing large amounts of vegetation from stream banks and avoid the expense of maintenance required on channels dredged through noncohesive (sand substrate) materials. William H. Gill Field Supervisor U.S. Fish and Wildlife Service, Kansas Field Office by letter September 11, 2003.

Response: In preparation for the scoping process, removal of riparian vegetation was identified by the Corps as one potential measure that could potentially increase the discharge capacity on the lower part of the Kansas River. Historic photographs taken during the 1950s show a Kansas River channel with little or no riparian vegetation. While this condition would not be considered optimal for fish and wildlife resources, this condition did provide optimal conveyance of floodwaters by maintaining a maximum cross sectional area for flood flows. Since the 1950s a woody riparian corridor has developed and as out of bank flows occurred additional material was deposited on the high bank further reducing the cross sectional area and conveyance capacity of the Kansas River channel. The Corps fully acknowledges the FWS position that the wholesale clearing of all riparian

vegetation on the lower Kansas River would have adverse effects on fish and wildlife resources, water quality and recreational use of the river, but does not want to remove from consideration this early in the scoping process what, if any, mutually compatible conveyance and environmental benefits could be realized by converting and maintaining a portion of the woody riparian corridor to shallow water habitat.

3.2 Comment: Restoring some vegetation (trees probably) along the river will not only hide the ugly channels in the metro area but also provide some wildlife habitat. The river is a great place for canoeing, fishing, etc. Helene Miller, Liberty Missouri, comment card August 20, 2003 Public Scoping Meeting.

Response: The Corps' Environmental Operating Principles presented on March 26, 2002 and other regulations provide guidance to the Corps to actively seek design solutions for flood damage reduction projects that will also achieve environmental sustainability. Alternatives developed for this project will evaluate the potential for environmental enhancement and ecosystem restoration where opportunities exist.

3.3 Comment: Environmental Sustainability & Corps Environmental Operating Principles. As you know, in March 2002, Lt. General Robert Flowers announced the U.S. Army Corps Engineers Environmental Operating Principles to guide the Corps in all of its work. These principles articulate strong support for designing and constructing environmentally sustainable projects. Use of these principles to define the scope of this project might have several interesting implications. The broadest, however, would suggest that the project scope itself seek opportunities to enhance and restore environmental conditions wherever possible, rather than restricting the scope to mitigating negative impacts. Tom Jacobs, Manager Environmental Programs, MidAmerica Regional Council by letter September 17, 2003.

Response: As alternatives are developed thru the EIS process for the seven levee project area, the study team will analyze potential opportunities for ecosystem restoration and recreation development options that can be combined with the primary purpose of flood damage reduction. These opportunities will need to be evaluated in terms of the study authority, the availability of funding, and based upon the approval of the levee district sponsors.

3.4 Comment: Restoration sites and regional planning. MARC, in association with a broad range of federal, state and local partners (including the Corps) is working to develop a regional natural resources inventory. This GIS-based initiative will seek to identify critical natural areas, natural resource conservation needs and environmental restoration opportunities. Opportunities to restore environmental conditions on some of these sites identified through this initiative should be seriously evaluated as project alternatives are developed. Tom Jacobs, Manager Environmental Programs, MidAmerica Regional Council by letter September 17,2003.

Response: The team will use the regional natural resources inventory to identify environmental restoration opportunities in the study area. As flood reduction alternatives are developed for the study area the opportunities for wetland and ecosystem restoration will be evaluated in more detail for specific sites. The Corps has extensive experience in designing and implementing ecosystem restoration projects along the Missouri and Kansas River systems and can bring this knowledge to the Kansas Citys Seven Levee Flood Damage Reduction Project.

4. Cultural and historic issues

4.1 Comment: At this time, we have no particular areas of concern although a number of historic trail routes and farmstead locations are recorded within these areas on historical maps. Although we have not identified any known archeological sites or historic structures within the areas identified, we would like the opportunity to review any future construction projects propose as a result of the study. Mary R. Allman, Kansas State Historical Society by letter August 18, 2003.

Response: Comment noted. The Kansas State Historical Society will be consulted regarding any cultural resources that may be impacted by alternatives developed for this project.

4.2 Comment: We would like to be up dated on all issues pertaining to the Kansas City levees for historical, cultural, and environmental issues. Sherri Clemons, NAGPRA Wyandotte-Nation, Email comment received August 14, 2003

Response: Comment noted.

5. Other comments

5.1 Comment: You should seriously consider buying development rights on ag lands upstream (and perhaps downstream) where the floodwaters will be allowed to go and spread out. It makes no sense to continually narrow the river channel pushing water levels higher, to allow levee development in floodplains. Buy the land or at least the development rights in places. Some could be used for wetland creation. The rest could be farmed. Helene Miller, Liberty Missouri, comment card August 20, 2003 Public Scoping Meeting.

Response: Comment noted. A program similar to what you have suggested is currently being implemented by the Corps of Engineers through the Missouri River Fish and Wildlife Mitigation Project. This project has authorized the purchase of 166,750 acres from willing sellers in the Missouri River floodplain from Sioux City, Iowa to the mouth of the river at St Louis, Missouri. The primary purpose of this project is to mitigate the habitat lost as a result of bank stabilization and navigation projects implemented over several decades in the floodplain area. Additional information can be obtained by calling the Corps of Engineers at (816) 983-3324 or on the project website: http://www.nwk.usace.army.mil/projects/mitigation/.

5.2 Comment: Please advise FEMA to attend Agency Scoping Meetings. Region VII contact: Phil Kirk, phil.kirk@dhs.gov (816-283-7076) Roger Benson, FEMA R-VII Kansas City, Missouri, comment card August 20, 2003 Scoping Meeting.

Response: Mr. Kirk will be added to our agency contact list.

5.3 Comment: How would the development/redevelopments at KCMO Riverfront impact your evaluation of potential improvements to the levee systems adjacent to the Missouri River. Gabriel Okafor, Division Manager, Economic Development and Business Assistance Kansas City, Missouri, comment card August 7, 2003 Scoping Meeting.

Response: Development and redevelopment of the KCMO Riverfront will be evaluated in the economic impact analysis section. The economic analysis will note any increase in the level of real estate and other assets in the study area resulting from recent and proposed economic development plans.

5.4 Comment: Will reports include any impact on maritime commerce? Update your agency list: Change US Coast Guard Second District to US Coast Guard Marine Safety Office St. Louis. LTJG Tom Morgan, Planning Division Chief, US Coast Guard Marine Safety Office, St. Louis, Missouri, comment card August 7, 2003 Scoping Meeting.

Response: The Transportation Section in the Draft EIS will address the potential impacts of alternatives being analyzed on Maritime and other transportation resources in the study area.

5.5: Comment: Good information on general direction that the Corp is taking toward this task. Abe Shirazi, Parks and Recreation Department, Kansas City, Missouri, comment card August 7, 2003 Scoping Meeting.

Response: Comment noted.

5.6 Comment: Keep MoDOT informed related to proposed work adjacent to all Mo. River Bridges and highways, (indicated work near Rte. 169). Keep Kansas City District of MoDOT notified. Michael Stelzleni, Technical Support Engineer, MoDOT, comment card August 7, 2003 Scoping Meeting.

Response: Comment noted. The Kansas City District of MoDOT will be included on the mailing list and kept informed through the NEPA process with the preparation of a Draft EIS and public meetings. If specific transportation related issues are identified as related to flood protection alternatives, MoDOT will be contacted to review transportation issues and impacts.

5.7 Comment: Clay County's concerns center around (1) Bridge safety, Broadway to 291, (2) Natural habitat, (3) Recreational opportunities, and (4) Navigation of Missouri River. Not interested in commercial (business) development along the river as it's all in the floodplain. Would like to help NKC and Birmingham Levee Districts with discussions of solutions, ideas. Carole Bloom, Planning and Zoning Director, Clay County, Missouri, comment card August 7, 2003 Scoping Meeting

Response: The impacts of any proposed alternatives developed for this project will be analyzed for bridge safety, natural resource, recreational opportunities and navigation in the Draft EIS. The Corps is open to discuss with government officials and community stakeholders any alternatives or solutions that they want to propose for the flood reduction project.

5.8 Comment: I believe that the river needs to be accessible and enjoyed for people to support adequate flood protection. I suspect adequate will prove to be extensive and costly, based on reducing the threat of failure in the underlying geologic structure of the Kaw and Missouri river valleys in the metro area. But it needs to be done, obviously, even if that means pouring footings or jacking pilings for the levee all the way down to bedrock. This is about human and economic security for the metro region, after all. Randy Niere, Email comment received August 22, 2003

Response: Comment noted.

U.S. Army Corps of Engineers, Kansas City District

Appendix C

Agency Correspondence

U.S. Fish & Wildlife Service
Draft Coordination Act Report

United States Department of the Interior

National Park Service

Midwest Region
601 Riverfront Drive
Omaha Nebraska 68102-4226

APR 2 3 2006

732.17 (MWR-P/G)

Mr. Richard A. Skinker
Environmental Resources Specialist
Room 843, PM-PR
Kansas City District, U.S. Army Corps of Engineers
601 East 12th Street
Kansas City, MO 64106-2896

Dear Mr. Richard Skinker:

The National Park Service Midwest Regional Office records do show Land and Water Conservation Fund involvement in the Louis and Clark Historic Park known as Kaw Point Park 29-00559 in Kansas City Missouri.

The Riverfront Park also known as Berkley Park does not show in our records as an LWCF project. We do show a D/Riverview Park. You may want to check further to see if this is the same site.

Any further questions you may reach me at 402-661-1560.

Sincerely,

Jim Krejci
Outdoor Recreation Planner

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
930 East Highway 56
Olathe, Kansas 66061-4989

Phone: 913-764-1931
FAX: 913-829-4490
www.ks.nrcs.usda.gov

Richard A Skinker, PM-PR
Room 843
700 Federal Building
601 E 12th Street
Kansas City, MO 64106

Re: Kansas City Levees Feasibility Study Wetland Question

Dear Mr. Skinker; April 6, 2006

This is in response to your inquiry of wetland delineation along the right descending bank of the Kansas River between river miles +/- 11 to 13, Wyandotte County, Kansas. This area is located on map sheet 45 of the Leavenworth and Wyandotte Counties Soil Survey.

No request for a wetland determination by the Natural Resources Conservation Service (NRCS) has been requested for this area. There are no NRCS delineations of wetlands on map sheet 45 of the Leavenworth and Wyandotte Counties Soil Survey.

Sincerely,

Debra J Sumner

Debra J Sumner
District Conservationist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Field Office
315 Houston Street, Suite E
Manhattan, Kansas 66502-6172

September 28, 2005

Colonel Michael Rossi
District Engineer
Kansas City District, Corps of Engineers
700 Federal Building
601 East 12th Street
Kansas City, Missouri 64106-2896

Attn: CEMRK-EP-PR
Richard A. Skinker

Dear Colonel Rossi:

Enclosed is a copy of our draft Fish and Wildlife Coordination Act Report for the Kansas Cities, Missouri and Kansas flood damage reduction project located in Kansas City, Kansas and Kansas City, Missouri.

This report is intended to accompany the U.S. Army, Corps of Engineers feasibility report on the proposed project and in its final form will be attached to and incorporated into the body of the report to Congress.

We would appreciate your review and comments on our draft report. We are also transmitting copies of this draft report to the Kansas Department of Wildlife and Parks, the Missouri Department of Conservation, and to our Regional Office in Denver, Colorado for concurrent review.

If you have any questions concerning this report, please contact Dewey Caster or me at 785 539-3474. We would appreciate receiving any comments you may have by October 21, 2005.

Sincerely,

Michael J. LeValley
Field Supervisor

Enclosure

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT FOR THE KANSAS CITIES, MISSOURI AND KANSAS FLOOD DAMAGE REDUCTION PROJECT KANSAS CITY, MISSOURI AND KANSAS CITY, KANSAS

PREPARED FOR THE
UNITED STATES ARMY, CORPS OF ENGINEERS,
KANSAS CITY DISTRICT, KANSAS CITY, MISSOURI

BY THE
UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
KANSAS FIELD OFFICE
MANHATTAN, KANSAS

September, 2005

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Kansas City District, Corps of Engineers, is in the process of developing a feasibility study for flood damage reduction measures for the cities of Kansas City, Kansas and Kansas City, Missouri. This Draft Fish and Wildlife Coordination Act Report describes the study area, identifies important aquatic and terrestrial resources, evaluates impacts of flood damage reduction measures, and describes mitigation measures.

The project area is highly urbanized inside the existing levee system. The primary impact from a fish and wildlife perspective will be the loss of terrestrial habitat from levee and floodwall construction, permanent loss of wetlands from levee construction, and temporary loss of terrestrial habitat due to construction activities and borrow construction. Therefore, the Fish and Wildlife Service recommends the following:

RECOMMENDATIONS

1. Riparian and wetland habitats should be avoided to the maximum extent practicable when selecting borrow sites for the proposed levee raises and compensatory mitigation should be undertaken for unavoidable impacts.

2. Levees should be seeded with warm season grasses such as switch grass.

3. Removal of mature cottonwoods, and other native vegetation should be avoided where possible, and if they are removed, replace woody vegetation by establishing two acres of native vegetation for every acre impacted.

4. The Corps should create wetland mitigation habitat to compensate for the loss of wetland acreage from construction of the project. Because an, as yet, unknown number of acres of farmed wetland may be directly impacted by borrow activities it may be necessary to restore non-wetland habitat to wetland habitat. Farmed wetlands should be mitigated at a 1.0 to 1.0 ratio.

5. Since channelization, levee construction and floodplain development have already resulted in a dramatic loss of riparian and wetland habitats in the Missouri and Kansas River basins, the alternative to remove riparian vegetation to increase discharge capacity of the lower Kansas River should be dropped from further consideration.

The following recommendations describe opportunities to provide fish and wildlife enhancement through the project.

6. Encourage wetland development and hydrological reconnection to the river at existing borrow areas landward of the levee units.

7. Provide river access at the Argentine Levee segment.

8. Establish native vegetation (trees and shrubs) riverward of levee segments where riparian woodlands are sparse or nonexistent.

9. Potential for aquatic and wetland restoration at Liberty Bend Cut-off just downstream of Kansas City should be explored.

LIST OF FIGURES

INTRODUCTION

This Draft Fish and Wildlife Coordination Act Report (Report) is submitted pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), and the fiscal year 2004 Scope-of-Work Agreement between the U.S. Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers, Kansas City District (Corps) for the Section 216, Local Flood Protection Feasibility Study. This report is designed to accompany and is to be incorporated into the Corps' feasibility report on the proposed project. The purpose of the feasibility study is to determine if there is a practicable alternative for reducing flood damages along the Kansas and Missouri rivers in the vicinity of the two Kansas Cities, Kansas and Missouri.

This study was authorized under authority of Section 216 of the Flood Control Act of 1970, as amended.

The Service provided a Planning Aid Letter dated July 12, 1999 to Mr. Michael G. Trail, Deputy for Project Management regarding this project. Our letter focused on fish and wildlife resource needs, opportunities and impacts associated with alternatives for the Kansas Cities, Flood Protection Project, as envisioned in 1999.

DESCRIPTION OF THE STUDY AREA

The Missouri River originates in southwestern Montana and flows about 2,315 miles to join the Mississippi River near St. Louis Missouri. The Kansas River originates on the plains of northeastern Colorado and flows 1,242 miles eastward draining northern Kansas, southern Nebraska and northeastern Colorado and joins the Missouri River at Kansas City. The River Mile (RM) references used in this report are measured upstream from the confluence of the Missouri River with the Mississippi River or upstream of the confluence of the Kansas River with the Missouri River. The project area is located between RM 358 and 374 on the Missouri River and between RM 0 and 10 on the Kansas River, Figure 1-1. This local protection project consists of improvements to six levee units along both banks of the Missouri and Kansas Rivers in the Kansas City Metropolitan area, Figure 2-2.

Most of the study area is heavily urbanized floodplain occupied by traffic arteries, rail lines and rail yards, and commercial-industrial development. Above the floodplain, the Kansas and Missouri hillside areas are occupied by residential and commercial/ industrial development.

The study area is part of the Osage Plains physiographic section of eastern Kansas and western Missouri, a maturely dissected and gently rolling region with relatively wide stream valleys. The topography is developed on Pennsylvania age shales with interbedded limestone, sandstone and coal. The natural, alluvial soils are silt and silty clay loams of the Onawa-Haynie association. Hillside soils are derived from loess and limestone/shale deposits and can be described as silty loams of the Knox-Ladoga association.

The main topographic features of the area are the valleys of the Missouri and Kansas Rivers and their tributaries. The Missouri River valley is generally two to 3 miles wide, and the Kansas River valley is slightly more than 1 mile wide. The uplands along the Missouri River valley are deeply dissected loess hills with limestone outcrops. Steep slopes and breaks formed by differential erosion of limestone shale and sandstone are along the Kansas River and its tributaries. The divide between the rivers and their tributaries are rolling to hilly loess and till uplands.

As indicated previously, the floodplains of the Kansas and Missouri Rivers at the Kansas Cities have filled with major industrial, transportation, and municipal, residential developments. Those sites, subject to annual flood events, were incorporated in the Kansas Cities flood control project beginning in the mid 1930's.

The original local flood protection project was authorized by the Flood Control Act of 1936 and construction was started in 1940. Amended plans on which the present project is based were authorized by the Flood Control Acts of 1944, 1946 and 1954.

To facilitate construction, management, and operation, the overall project was set up in seven units. The geographical units are: the Fairfax-Jersey Creek Unit on the Missouri River in Kansas; the Argentine and Armourdale Units on the Kansas River in Kansas; the Central Industrial District Unit, which lies in both States and is bounded on the west by the Kansas River and on the north by the Missouri River; and three other Units: the North Kansas City, East Bottoms, and Birmingham Units, all in Missouri. The design and construction of each of these units were coordinated with the others, yet each became effective as it was completed, and each is operationally independent. Complete effectiveness of the overall project is contingent upon adequate reservoir control in the upper Missouri and Kansas River Basins. Levees, flood walls, relief wells, gravity drain structures, and pumping plants comprise the main protective structures. Other major elements include channel and flood way improvements in both rivers, bridge and approach alterations, and the Liberty Bend cutoff in the Missouri River immediately downstream from Kansas City.

The Flood Control Act of 1962 authorized and provided for modification of the portion of the Kansas City project along the Kansas River involving the Argentine, Armourdale, and Central Industrial Districts and alterations to bridges and approaches to provide a higher degree of protection.

The cost of the Kansas Cities project as authorized in 1944 is $42,668,213 Federal and $5,120,000 non-Federal. The cost of the 1962 authorized modification on the Kansas River was $28,300,000 Federal and $7,090,000 non-Federal. (COE ,1981).

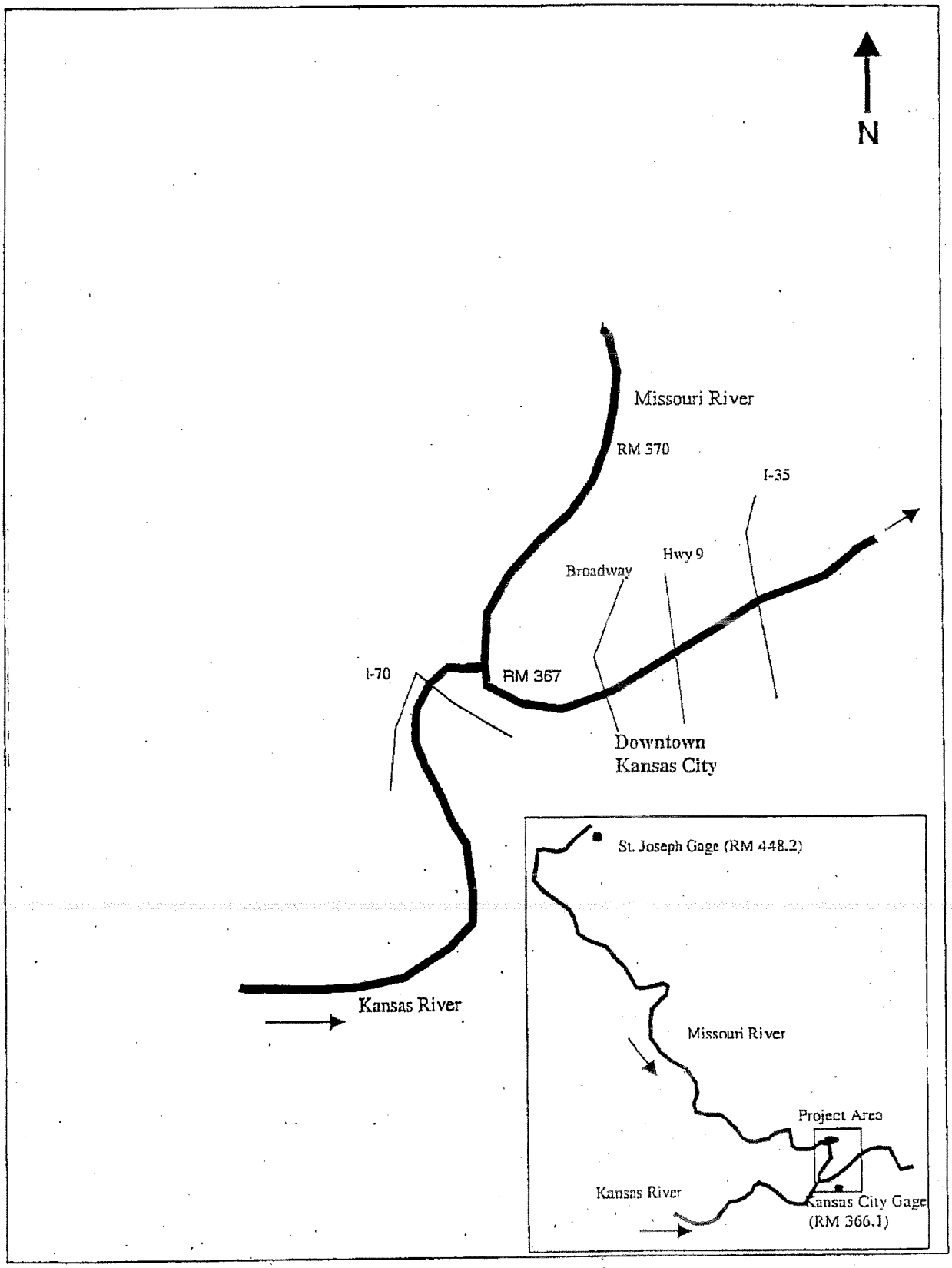

Figure 1-1: Schematic of the project area.

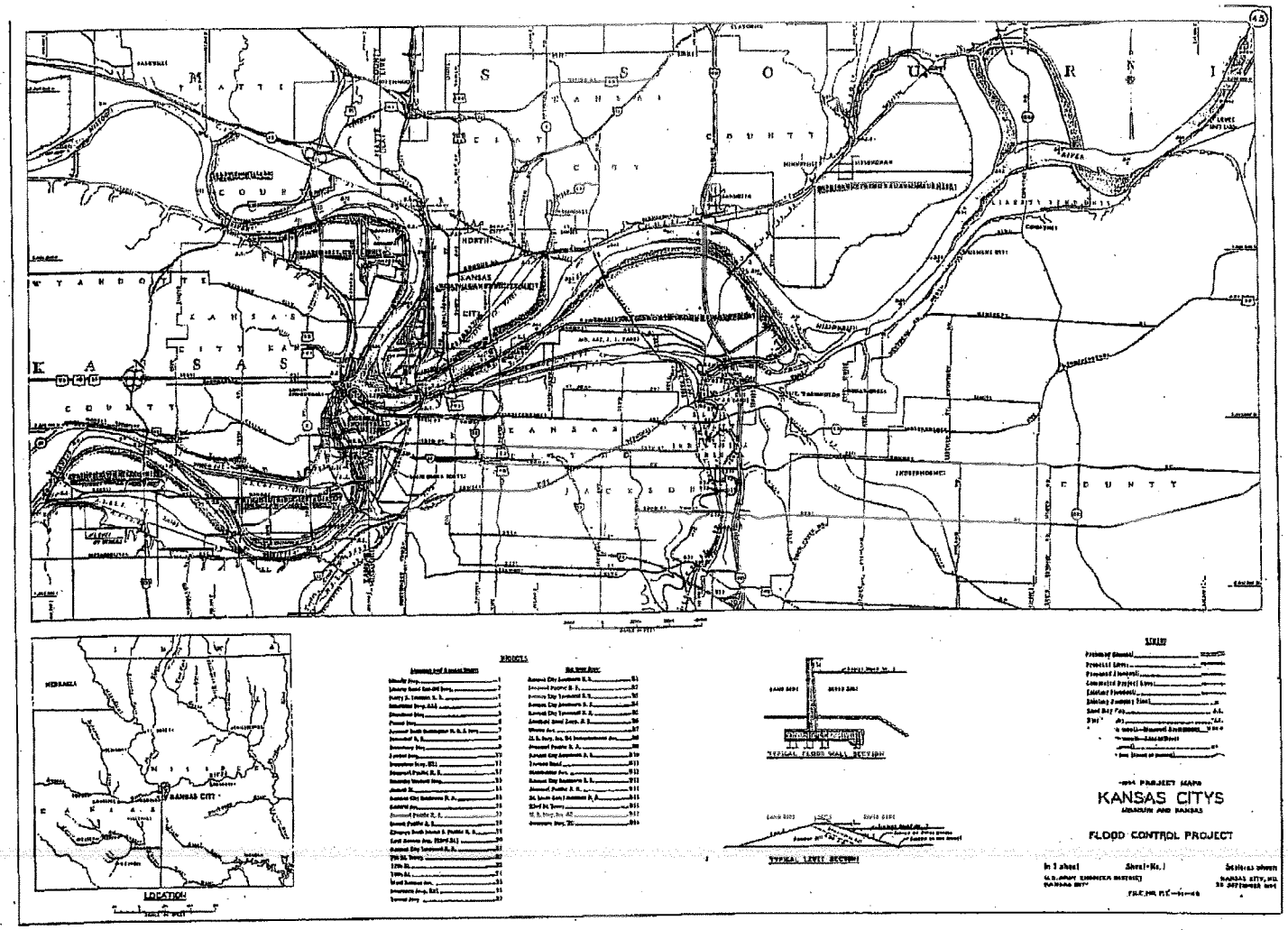

Figure 2-2: Kansas Citys Project Features

Terrestrial Resources

A review of historical conditions on the Missouri River can facilitate an understanding of how the river formerly functioned, and suggest the ecological functions and processes that were essential to development of such an abundant and rich array of fish and wildlife resources. However, clearly defining historical conditions is somewhat problematic, since most of the more detailed quantitative and qualitative descriptions of the Missouri River occurred during or after major episodes of human impact. Nevertheless, we can broadly surmise how the presettlement Missouri River appeared.

The river at this time was free-flowing, without the restrictions of dams and diversions. Flows varied dramatically. Late summer flows at Kansas City were low in contrast to today's summer flows, probably averaging about 29,500 cubic feet per second (cfs), with dry year flows dropping to perhaps about 4,700 cfs.(Galat, 1999). Flows fluctuated widely in response to winter rains, and sustained high flows occurred in the spring and early summer in response to snow melt.

The higher flow events resulted in over bank flooding, often over extensive reaches of the valley floor. Overflow areas were covered by dense forests of riparian vegetation. Some accounts place the riparian band as extending up to 14-15 miles along each side of the river and encompassing at least one-half million acres. Extensive swamps, marshes, and other diverse and expansive wetlands were also nourished by the regular flooding events.

Bank erosion and river meander, the basic forces for most riverine ecological processes and functions, were unimpeded. Erosion was most active on the outsides of the numerous meander bends, where the highest velocities impinged directly on the earthen substrates. As one bank was eroded, the opposite bank experienced sediment accretion. Some of the meanders became cut off from the river, forming oxbow lakes and other broad, highly diverse channel overflow areas. Erosion also resulted in the input of large volumes of woody debris of a broad range of sizes, types, and complexities into the river. The fish, wildlife, and riparian vegetation of the river were in a dynamic equilibrium, adjusted to, and dependent upon the cycle of erosion, deposition, and changing channel pattern as the river slowly swung back and forth across its meander belt. The ecological health and productivity of the river at any point in time were dependent on periodic rejuvenation associated with these natural processes and changes.

From this pristine, presettlement picture of the river, jump forward 150 years to the present era. The most significant environmental changes and impacts have now occurred. The extensive riparian forests and wetlands have been largely removed through urbanization and land clearing for agricultural purposes. The river is now controlled by dozens of dams on the main stem and tributaries. The lower river is channelized and largely confined by levees and bank stabilization, and overall, a mere remnant of the ecologically dynamic and complex system of the past.

The confluence of the Kansas with the Missouri river contains only remnants of the pre-settlement vegetative community, which was likely, a wet-mesic bottomland forest along the floodplain with slopes taking on characteristics of the mesic limestone dolomite forest. Tallgrass prairie vegetation was also likely present as the region was somewhat park-like, with prairies being interspersed with oak-hickory-maple forests. (Nelson, 1987) Only remnants of these dynamic ecosystems remain. The area was likely initially cleared for farms and homes, later for commerce and industry. The forested slopes of the hills of Kansas City, Kansas and Missouri remain relatively undeveloped, chiefly due to slope. Urban type amenities and infrastructure are present above and below this band of woodland.

The floodplains of the Kansas and Missouri Rivers at Kansas City are largely developed, but has bands of a riparian vegetation river ward of some levee units. The dominant trees in these riparian bands are cottonwood, willows, green ash, silver maple, boxelder and sycamore. The upland hillsides are occupied by grasses and oak-hickory forest associations as stated previously. Because of the urban nature of the Kansas Cities, which has resulted in extensive development within the floodplain, the value of the remaining areas of native vegetation riverward of the levees is greatly enhanced. They appear as a string of habitat beads or pearls strung along the length of the river with an urban backdrop. The largest areas of native vegetation are riverward of the East Bottoms units in Missouri, and the Argentine and Fairfax-Jersey Creek Units in Kansas.

Areas of special note are east of the East Bottoms unit at the mouth of the Blue River and the area of Big Shoal Creek as it emerges from the bluff, passes around the northern end of the Birmingham Unit and enters the Liberty Bend Cut-off. Although small, the areas incorporate side channels, wetlands, and bottomland hardwoods. The areas retain some natural hydrology and some semblance of natural floodplain.

Mammals associated with these remaining habitats include white-tailed deer, red and gray squirrels, eastern cottontail rabbits, racoons, coyotes, gray and red fox, skunks, opossums, mink, beaver and muskrat. Small mammals such as mice, rats, voles, and bats account for the majority of species present. White-tailed deer is the only naturally occurring large mammal still common within this area of urban development.

Riparian and associated upland woodlands provide a year-around habitat for approximately thirty-one species of birds. Approximately sixty-seven species nests here in addition to the year around residents, while fourteen additional species are winter residents only. More than 110 species use the corridor regularly during fall migrations. The most spectacular migration is that of the snow goose. The fall migration is impressive, with Squaw Creek National Wildlife Refuge north of Kansas City playing host to two hundred thousand snow geese during the fall migration. But the fall concentrations pale in comparison to the spring flocks moving north to Canada in the spring. The spring migration is more urgent than the trip south, and it is often stopped by bad weather. When that happens, the number of geese along the river may reach a million birds north and east of Kansas City.

Wetlands

The wet-mesic bottomland forest, found riverward of the current levee systems, is typical of the Missouri and the Kansas river floodplain. Historically, wet mesic bottomland forest was the most extensive bottomland forest natural community in Missouri (Nelson, 1987). It has a diversity of tree species such as pin oak, cottonwood, river birch, green ash, and hackberry, cherry, sweetgum, hawthorn, dogwood, hickories, wildplum, persimmon, the maples, elm, and sassafras. A well-developed understory is often present, containing poison ivy, elm, nettle, and honeysuckle. These communities provide habitat for a wide variety of resident and migratory wildlife. Forested wetlands have been found to support significantly higher abundance and diversity of bird species compared to upland forests (Brinton, 1981).

Wetland types listed on the National Wetland Inventory (NWI) maps for the area include, temporarily flooded palustrine emergent wetlands (PEMA), seasonally flooded emergent wetlands (PEMC), seasonally flooded broad-leaved deciduous scrub-shrub wetlands (PSSI), temporarily flooded broad-leaved deciduous palustrine forested wetlands (PFO1A). The R2UBA listed wetland is the main channel of the Missouri and Kansas Rivers. Most of these wetlands are located riverward of the levee system and should not be affected by levee heightening. Figures 3- 7.

A jurisdictional wetland determination will be necessary if levee alignments or borrow areas directly impact wetlands within agricultural lands or other areas landward of the existing levee alignments. The quantity and quality of existing wetland will determine the amount of compensation necessary to offset project losses. A wetland mitigation plan would be developed in coordination with at least the Corps, Service, EPA, and the Kansas Department of Wildlife and Parks or the Missouri Department of Conservation. This plan would include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan would be a condition of any Section 404 permit issued for the project. The plan should be implemented regardless of the regulatory nature of the wetland.

Compensatory Mitigation

Advance creation	1.5:1	Forested
	1:1	Emergent wetland
Concurrent creation	2:1	Forested
	1.5:1	Emergent wetland
Advanced restoration	1.5:1	Forested
	1:1	Emergent wetland
Concurrent restoration	2:1	Forested
	1.5:1	Emergent wetland
Advanced enhancement	3:1	Forested

U.S. Fish & Wildlife Service

Wetlands Mapper

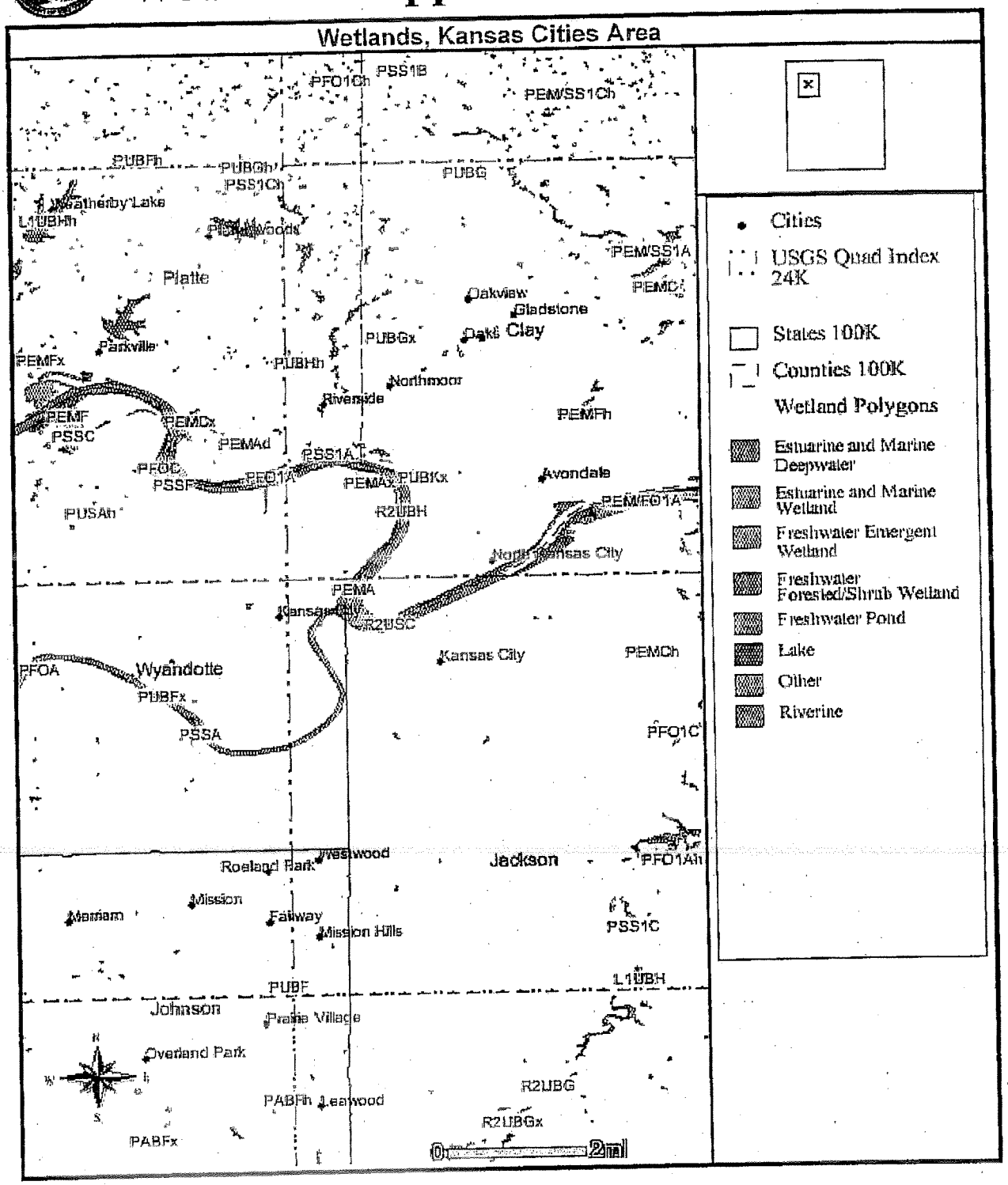

Figure 3-3

U.S. Fish & Wildlife Service

Wetlands Mapper

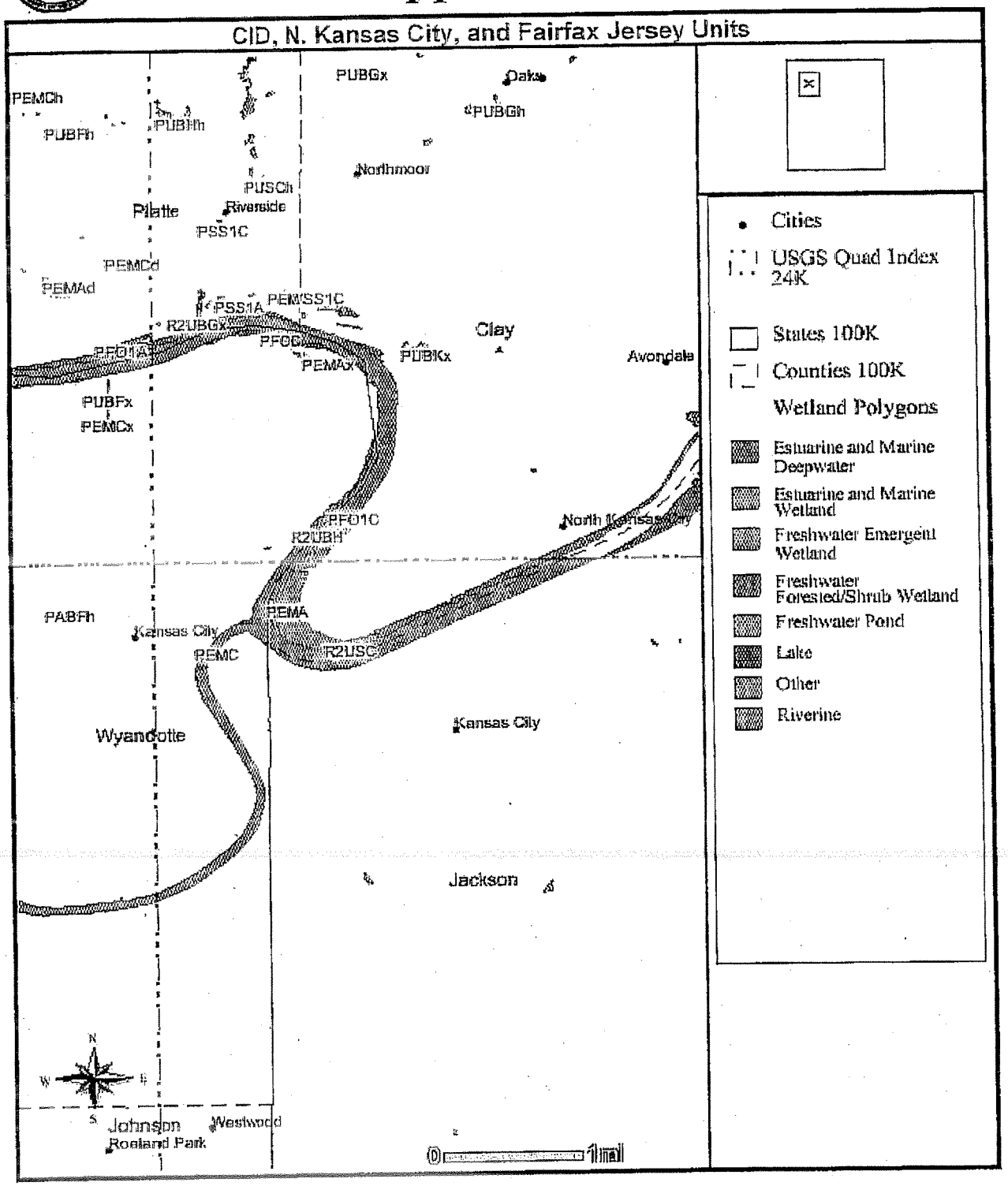

Figure 5-5

U.S. Fish & Wildlife Service

Wetlands Mapper

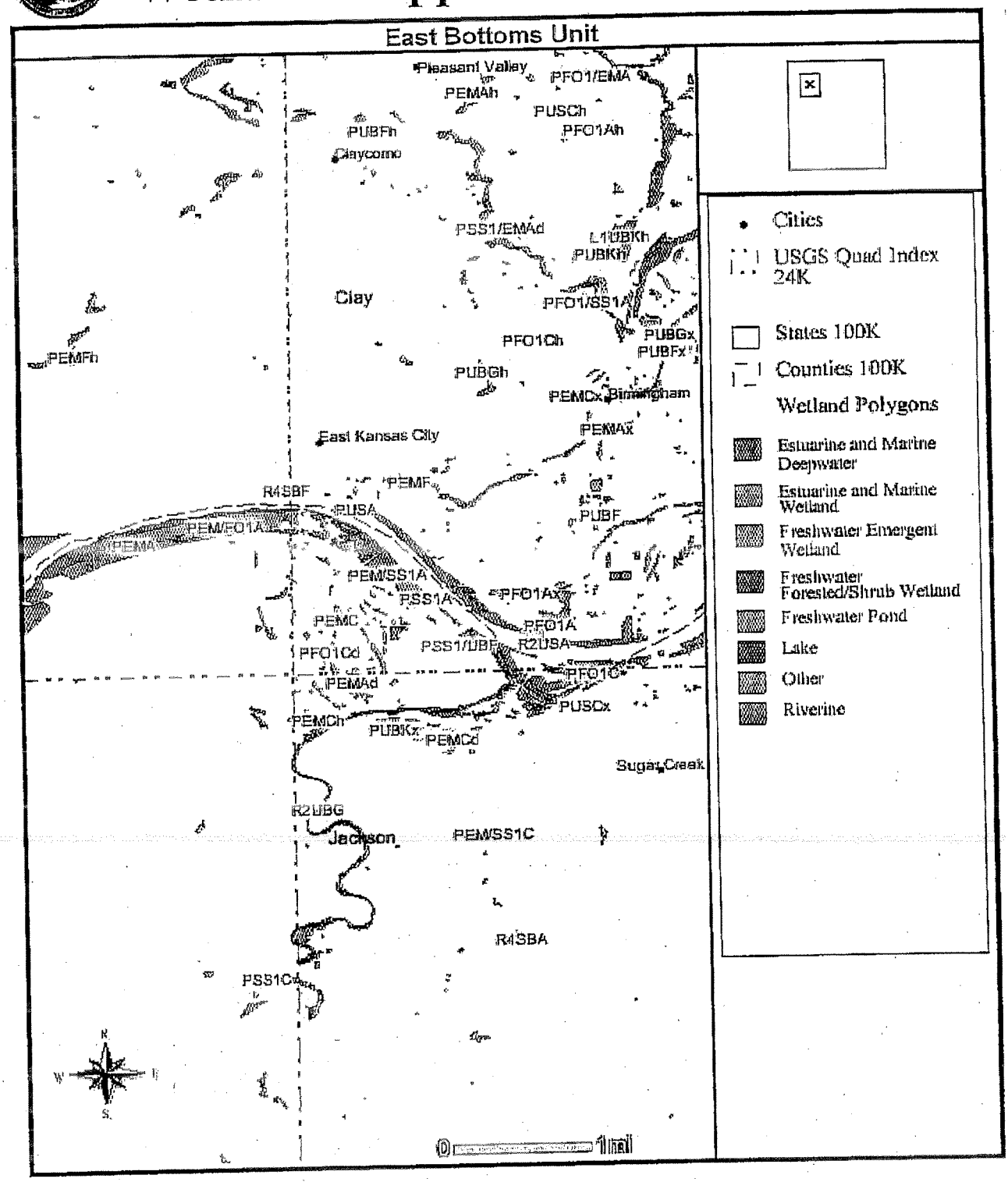

Figure 4-4

U.S. Fish & Wildlife Service

Wetlands Mapper

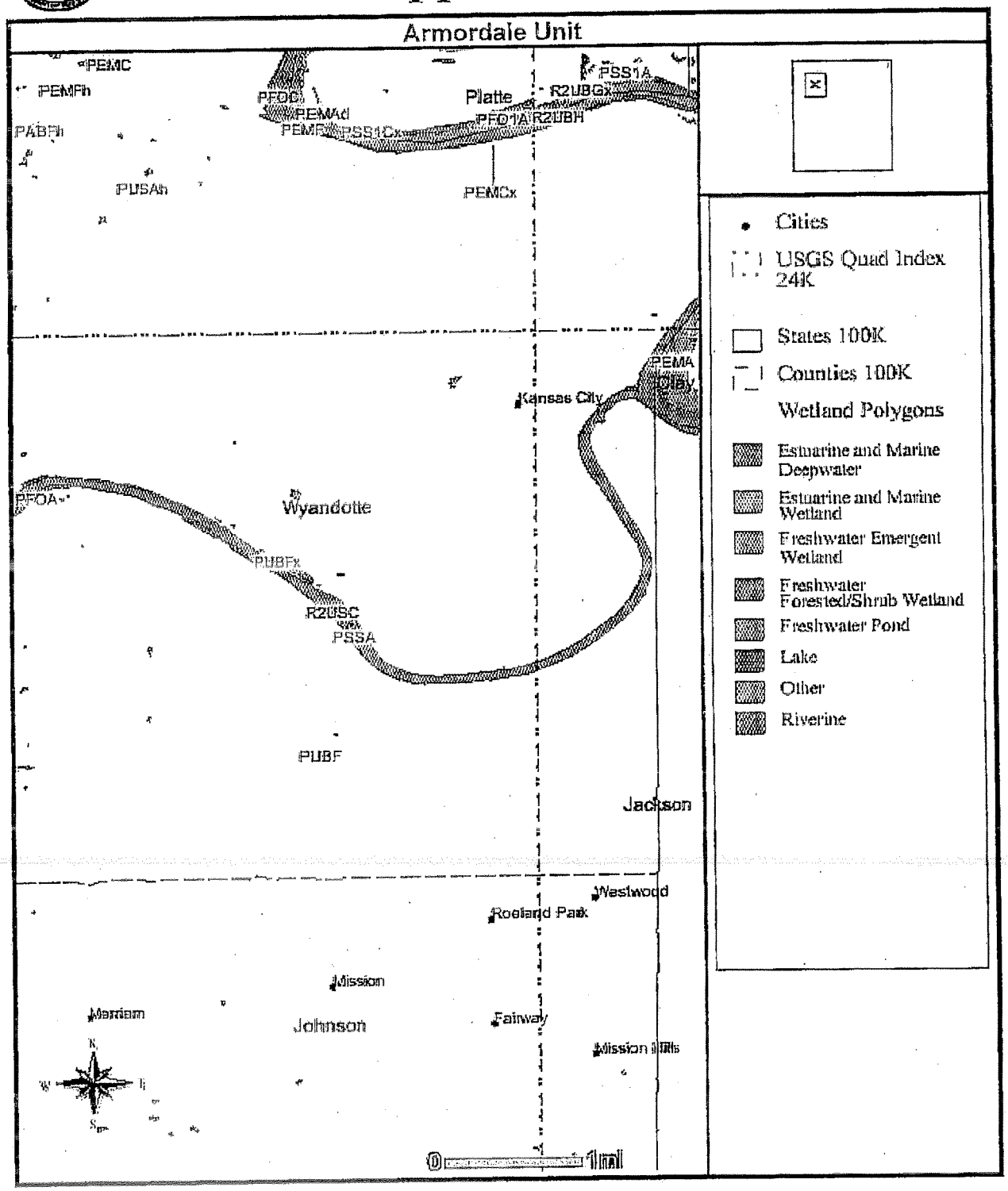

Figure 6-6

U.S. Fish & Wildlife Service

Wetlands Mapper

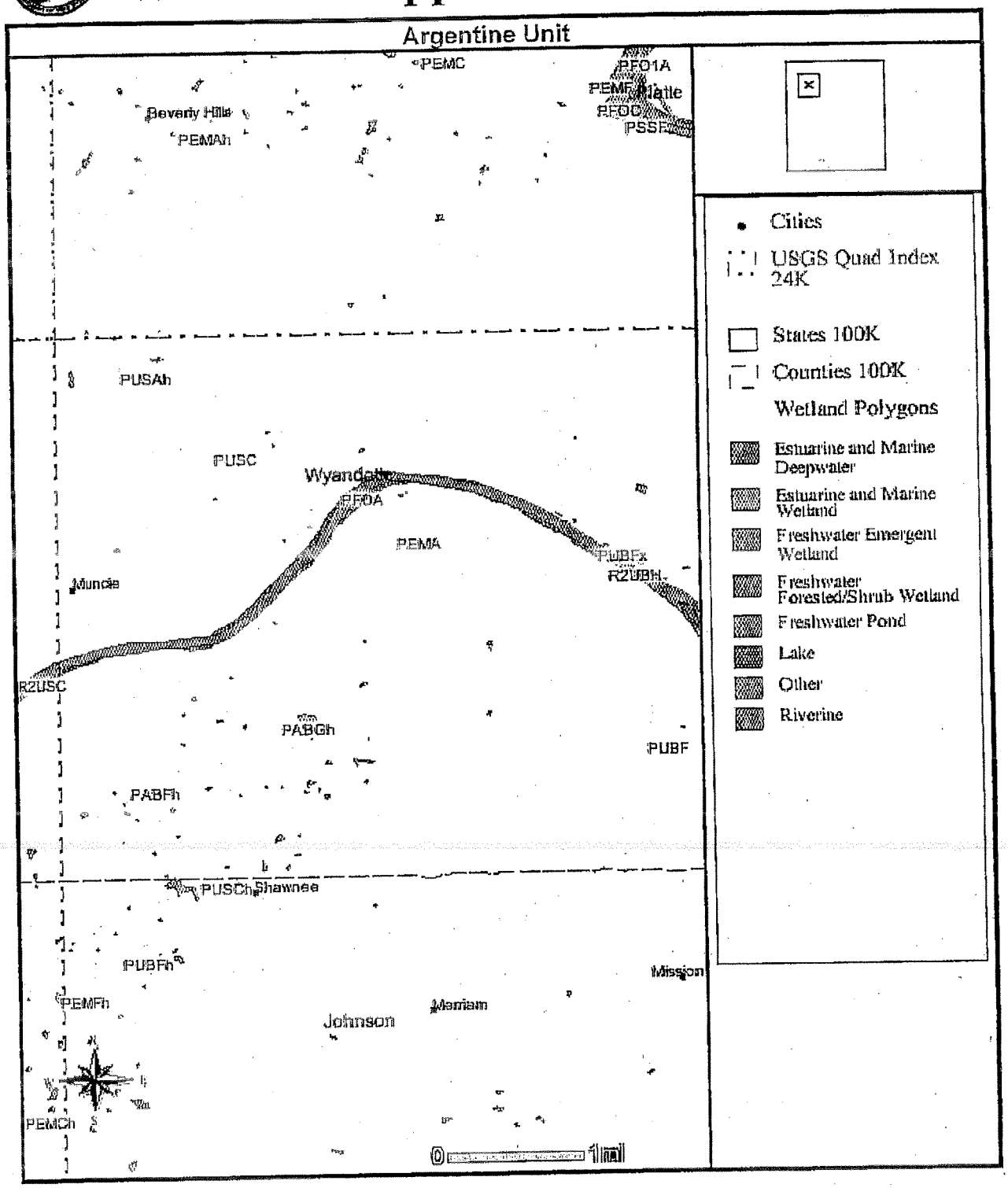

Figure 7-7

	2:1	Emergent wetland
Concurrent enhancement	4:1	Forested
	3:1	Emergent wetland
Preservation	5:1	Forested

Aquatic Resources

The Missouri and the Kansas rivers have undergone considerable change since the Louisiana Purchase in 1803 and Louis and Clark's subsequent exploration of the Kansas River confluence on June 26, 1804. Modifications to the natural Missouri River floodplain ecosystem have been immense and ongoing for more than 150 years. Presently, 35 percent of the river's length is impounded, 32 percent is channelized or stabilized, and the remaining 33 percent is freeflowing. (Schmulbach and others, 1992). Major civil works projects involved channelization, channel maintenance, and impoundment and reservoir operation. Total cost for construction, operation, and maintenance of civil works projects through 1984 was nearly $6.2 billion. (Hesse, 1987). Agricultural, industrial, and urban development within the basin also significantly modified the Missouri River and its adjoining floodplain.

Presently all of the Missouri River from Sioux City, Iowa, to its mouth at Saint Louis, Missouri, is channelized. Even during flooding only about 10 percent of the original flood plain is inundated, as high agricultural and urban levees confine the river to a width of approximately 500 feet from Kansas City north (U.S.F.W.S, 1980). The impacts of channelization have been numerous and severe on the physical, chemical, and biological structure and function of the Missouri River and its flood plain. The most damaging of these alterations to aquatic communities has been the nearly complete isolation of the river from its flood plain, subsequent loss of flood plain habitat , drastic reduction in area and diversity of river channel habitats, and increased velocity of the main channel.

The Kansas River has fared better than the Missouri. There is evidence that the Lower Kansas River was generally wide and shallow, both before and since the 19th-century period of westward exploration and settlement. The indigenous fish fauna is mainly indicative of shallow, turbid streams. Most early traffic across the prairies was overland, rather than by river as in the eastern regions. Despite some successful ventures by steamboats there seems little reason to doubt that the Kansas was sand-filled nearly to its mouth as was the channel of the Missouri River which receives its flow. Although the river was and remains navigable for administrative purposes, "the government...considers the river for purposes of practical navigation as a whole unworthy of improvement." (Schoewe, 1951)

Although the river itself has not been channelized or "improved" for navigation, the flood plain is often farmed to the high bank of the river with extensive clearing of the riparian areas in the process. The cities of Junction City, Manhattan, Topeka, Lawrence and Kansas City and numerous smaller municipalities are located on or near the Kansas River. Each city is protected by a levee system with agricultural levees that protect the more fertile soils in between urban centers. Thirteen large Federal impoundments have been constructed which have a pronounced effect on the stream flows of the Kansas River Basin. The lower segment of the river is subject to intensive instream sand and gravel dredging that changes the course, depth, and substrate of the river. Dredging is responsible for significant changes in the benthic macroinvertebrate populations and fish populations in the immediate area of the activity.

Although major changes have altered the free-flowing Missouri and Kansas Rivers and many fish species native to the rivers have had serious population declines, most of the indigenous fish species still remain. Empirical data from certain river reaches verifies long term declines in commercial fisheries and certain sport fisheries and at least six big river fishes are of special concern. Table 1 lists the principal fish species occurring in the reach of these rivers in the immediate vicinity of the Kansas Cities.

Table 1- Principal Fish Species of the Lower Kansas and Missouri Rivers at Kansas City

Channel catfish*	Fathead minnow
Blue catfish	Bigmouth buffalo
Black bullhead	Smallmouth buffalo*
Flathead catfish	Quilback
Shortnose gar*	River carpsucker*
Longnose gar	Shorthead redhorse
Shovelnose sturgeon	Green sunfish
Gizzard shad*	Bluegill
Goldeye	White crappie
Carp*	Freshwater drum
Sand shiner	Walleye

*Dominant species

Threatened and Endangered Species

As a result of habitat losses and flow regime changes, four species dependent on the rivers are federally-listed as endangered or threatened and two species are candidates for listing. The bald eagle (Haliaeetus leucoccephalis), federally listed as a threatened species, frequents reservoirs and large rivers in Kansas and Missouri during the winter months. The Kansas River has nesting pairs of bald eagles, with parents and young remaining in the area through the spring and summer months. Eagles use large trees and snags in close proximity to water for perches where they feed

on fish and waterfowl. We recommend that any large trees or snags be avoided during project implementation. The piping plover (Charadius melodus), federally listed as a threatened species, is a seasonal spring and fall migrant through portions of Kansas and Missouri along the Kansas and Missouri Rivers, with nesting on the Kansas river. Plovers are associated with unvegetated shorelines, sandbars, and mudflats, utilizing aquatic invertebrates for food. The least tern (Sterna antillarum) utilizes similar unvegetated wetland habitat as do piping plovers, in the same geographic regions of Kansas and Missouri, feeding primarily on small fish. It occurs as a spring and fall migrant through this area and nests on the Kansas River upstream of Kansas City. This species is endangered. The pallid sturgeon (Scaphirhynchus albus) is a moderately large bottom-dwelling fish which occurs in low numbers in portions of the Missouri River and may occur in the lower Kansas River, below Lawrence during high flow events. It is believed to require sandbars, chutes, and backwater areas for feeding and loafing. It requires gravel bars and properly timed flows and water temperatures for reproduction and is federally listed as endangered.

Sturgeon chub (Macrhybopsis gelida) historically occurred along most of the Missouri River and large western tributaries including the Kansas River (Cross, 1975). It has experienced serious decline within its range and is a candidate for Endangered Species Act (ESA) listing.

Sicklefin chub (Macrhybopsis meeki) historically occurred in the Missouri River, lower Kansas River and lower Mississippi River (Cross, 1975, Lee, 1980). This species is declining markedly and is now a candidate for ESA listing.

Section 7 of the Endangered Species Act, 87 Stat. 884, as amended, requires an agency to ask the Secretary of the Interior, acting through the U.S. Fish and Wildlife Service, whether any listed or proposed endangered species may be present in the area of each Federal construction project. If the project may affect listed species, the Corps of Engineers should initiate formal Section 7 consultation with this office. If there will be no effect, or if the Fish and Wildlife Service concurs in writing there will be beneficial effects, further consultation is not necessary.

Kansas State Law (K.S.A. 32-504, 32-507: effective May 1, 1981) requires persons undertaking or sponsoring publicly funded or State or Federally Assisted action which is likely to impact endangered or threatened wildlife habitats where they are likely to occur, to obtain a project action permit from the Secretary of the Kansas Department of Wildlife and Parks prior to initiation of such action. In addition to the Federally listed threatened and endangered species, the State lists additional species that may be of concern within the project area. This list should be requested from the Environmental Services Section, Kansas Department of Wildlife and Parks, 512 SE 25th Ave., Pratt, KS 67124-8174.

According to the Missouri Department of Conservation's Natural History Data Base (1999) there are occurrences of state listed species or communities (aside from those previously mentioned) in the project area. Species and concerns should be requested from the Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102.

Wild and Scenic River Designation

The Kansas River is listed on the Nationwide Rivers Inventory (NRI). The NRI includes rivers selected on the basis of the degree to which they are free-flowing, the degree to which the rivers and their corridors are undeveloped, and the outstanding natural and cultural characteristics of the rivers and their immediate environments. The purposes of the inventory are several, including the identification of rivers which have potential to qualify for inclusion in the National Wild and Scenic Rivers System. The Kansas River was included in the inventory because of its outstanding scenic, recreational, fish, wildlife, and cultural values. Section 5(d) of the Wild and Scenic Rivers Act (Public Law 90-542) requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all federal agencies involved to potential national wild, scenic, and recreational river areas." A presidential directive and subsequent instruction issued by the Council on Environmental Quality and codified in agency manuals require that each Federal agency, as part of its normal planning and environmental review process, take care to avoid or mitigate adverse effects on rivers identified in the NRI.

In 1980 potential recreation sites adjacent to the Kansas River were identified by the Heritage Conservation and Recreation Service (now the Park Service) as an element of the Kansas River Bank Stabilization Study. The plan proposes that the reach of the Kansas River beginning at its confluence with the Delaware River downstream to Interstate Highway 635 Bridge Crossing, a distance of 57 miles, be designated as a component of the National Wild and Scenic River System. The Plan proposed fee acquisition of 18 acres and easements on between 14 and 98 acres of land on the right bank of the river between the 635 bridge and Turner Bridge. This site was to become the downstream terminus or take out point for the recreational river segment. The western half of the Argentine Unit on the Kansas River encompasses this site.

DESCRIPTION OF THE PROJECT

The units being considered for levee improvements are: the Argentine and Armourdale Units on the Kansas River in Kansas, the Fairfax-Jersey Creek Unit on the Missouri River in Kansas; the Central Industrial District Unit, which lies in Kansas and Missouri and is bounded on the west by the Kansas River and on the North by the Missouri River; and two other Units: North Kansas City and East Bottoms, both in Missouri. The Birmingham Unit is not being considered for improvements.

The Kansas Cities feasibility study is currently being conducted using a two-phased approach.

PHASE I

Levee unit improvement locations include Argentine, East Bottoms, North Kansas City-Harlem Segment, North Kansas City-National Starch Site, Fairfax-Jersey Creek-Board of Public Utilities (BPU) Floodwall, and the Fairfax-Jersey Creek Sheetpile Wall. The preferred alternatives for the levee units are as follows:

Argentine Unit

The preferred alternative for the Argentine unit is the nominal 500+0 levee raise with pump station and levee modifications. This raise equates to roughly a 1.5- foot to 2.5- foot raise along the entire length of the Argentine levee. Pump station replacement or modification would involve three existing pump stations. Levee raise modifications would include raises on existing floodwalls, new I-walls located on top of the existing levee, stop log gap raises, top cap raise, landside levee raise with berm, and landside levee raise with no berm. A rock toe would be constructed in areas of railbed congestion to allow steeper slope for the levee raise.

Estimated Borrow Requirement: 101,258 cubic yards

East Bottoms Unit

Pressure relief wells and a header collector pipe would be installed along the toe of the levee. This alternative is an augmentation to an existing collector system. Relief wells provide a reliable solution to control underseepage can be completed within the existing right-of-way. The small amount of soil required for the East Bottoms levee unit improvement will be acquired from commercial borrow sources.

Estimated Borrow Requirement: 400 cubic yards

North Kansas City Unit-Harlem Segment

An underground water collection system using of perforated pipe will be installed the full length of the levee along the landside toe to intercept seepage. Six manholes will be placed along the system to collect the seepwater and allow portable pumping units to be placed during flooding to pump collected water over the levee.

Estimated Borrow Requirement: none

North Kansas City Unit-National Starch

Pressure relief wells and a pump station will be installed into the existing stability berm along the landside toe of the levee. Installing relief wells at this site will provide a highly effective mechanism to control underseepage.

The small soil requirement for the East Bottoms levee unit improvement will be acquired from a commercial borrow sources.

Estimated Borrow Requirement: 400 cubic yards.

Fairfax-Jersey Creek Unit BPU Floodwall

An additional row of auger cast piles would be installed on the landward side of the pile cap. A foundation slab extension would be connected to the new row of piles. Additional piles and the slab extension will be installed the entire length of the existing floodwall.

Estimated Borrow Requirement: None

Fairfax-Jersey Creek Unit Sheetpile Wall

An open cell sheetpile wall will be "driven" into the existing foreshore/stability berm along the length of the existing wall utilizing a crane deployed on a floating barge.

Estimated Borrow Requirement: 1,675 cubic yards.

Proposed Borrow Area

The proposed borrow area is located on private land adjacent to the right descending bank of the Kansas River at river mile +/- 11.5, Sections 22, 27 & 28, Township 11 South, Range 24 East, Wyandotte County, Kansas. The primary uses of the land are mono fill lime storage and active row-cropping. Portions of the property are excavated to a depth of 20 feet for temporary lime storage, and subsequently filled, capped and graded to the surrounding elevation. A portion of the property is currently row-cropped under a lease agreement. The excavation borrow will be coordinated with the landowners to ensure that only clean borrow is obtained for the Argentine levee.

PHASE II

Phase II remains subject to negotiations with various sponsors.

Armourdale and CID Levee Units

Findings for overtopping risk and geotechnical/structural risk indicate the need to pursue potential reliability improvements in these units. Such improvements may involve earthen levee raises, floodwall raises, and underseepage improvement measures. This will involve a large amount of analysis and feasibility design work, and is expected to compromise the bulk of Phase 2 efforts.

The performance of the Birmingham Unit in Missouri currently meets the planning objectives of this study. Therefore, no reliability improvements are recommended under the proposed study.

OTHER PROJECT ALTERNATIVES

No Action Alternative

Under the No Action Alternative the levee improvement projects would not be implemented. The No Action Alternative would not change the existing fish and wildlife habitat in the Kansas Cities area.

Removal of Riparian Vegetation as a Measure to Increase Discharge Capacity of the Lower Kansas River

During the scoping process for this project the Corps and the levee districts adjacent to the Kansas River identified removal of riparian vegetation landward of the existing levee system as a measure to increase discharge capacity on the lower Kansas River.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

In general, the project area is characterized as urban consisting of industrial, commercial development with rail yards, major roads and bridges, secondary roads, and housing developments on and above the floodplain. The existing wildlife habitat is scarce, and of generally low quality due to habitat fragmentation and loss of habitat from the development that has been ongoing for more than a hundred and fifty years. Without the levee improvement project the few undeveloped or underdeveloped areas within the levee districts will continue to be converted to commercial and industrial use. Wildlife and their habitat will continue to decline.

FISH AND WILDLIFE WITH THE PROJECT

PHASE 1 IMPLEMENTATION

Construction of Phase 1 of the Kansas Cities Project primarily involves pump station replacement or modification, installation of new piles or slab extensions or adding concrete or fill to the crown and landward sides of the existing levee systems.

A large portion of the area protected by the current levee alignments is either industrial, commercial or urban in nature. The commercial/industrial areas are vegetated (if at all) by cultivated lawn grasses, shrubs and trees. Urban tolerant species such as squirrels, rabbits, moles, starlings, robin, house sparrow, Canada geese and white-tailed deer are common.

The loss of levee brome grasses during heightening of the existing levee system will be a short term loss. Re-seeding the levee to warm season grasses such as switch grass to reduce erosion and to insure the integrity of the levee system should be a priority of project implementation.

Previous development within the Missouri River Basin and the Lower Kansas River has had an adverse effect on fish and wildlife habitat. The Missouri River surface area has declined more than 50 percent. The river channel is now deep and has currents too swift to provide suitable habitat for many fish and wildlife species. River backwaters, chutes, sandbars, and oxbow lakes have been lost to flood plain development. The present project will not involve additional channel work or encroach on areas riverward of the levee units.

During project construction, Phase 1 of the Kansas Cities Project would cause temporary, short-term impacts to fish and wildlife from noise, dust, and the presence of workers and machinery. Runoff from construction areas, access roads, staging areas and unprotected fills could degrade water quality inside the levee system. Accidental spills of fuels, lubricants, hydraulic fluids and other petrochemicals would be harmful to aquatic life.

Construction would require approximately 102,933 cubic yards of fill from cropland located upstream of the Argentine Levee Unit on the Kansas River. Removal of fill material from within the cropland area has the potential to cause the loss of farmed wetland. Farmed wetland should be delineated within the borrow site and should be avoided if possible. If an unavoidable loss is incurred, the quantity and quality of the farmed wetland will determine the amount of compensation necessary to offset project losses. The wetland mitigation plan would be developed in coordination with the Corps, EPA, and the Kansas Department of Wildlife and Parks. This plan would include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan would be a condition of any permit issued for the project. The plan should be implemented regardless of whether impacted wetlands are classified as jurisdictional for purposes of the Clean Water Act.

Although the floodway cross section will remain essentially unchanged, the heightened levees will increase flood stages downstream and upstream at very high flood stages. Flood crests may increase in height (the water has no place to go but up) and floodwaters will be impounded upstream. In 1993, the constricted Missouri River floodplain prevented the Kansas River from draining. This caused water to back up in the Kansas River, flooding far into the state of Kansas. (White House Interagency Flood plain Management Review Committee, 1994) We are concerned that if Kansas City increases the height of its levees, other levee districts upstream and downstream will face the need to build their own levees even higher to avoid increased flood damages. Such cumulative effects should be addressed during the feasibility phase and NEPA documents.

Alternative to remove Riparian Vegetation from the Lower Kansas River to increase channel capacity.

The purpose of this alternative is to increase the capacity of the lower Kansas River to carry off flood water by enlarging the cross-sectional area (deepening) and smoothing the channel. Clearing all woodland riverward of the levees is designed to increase flow velocity.

The initial and secondary impacts of the removal of riparian vegetation associated with this alternative will be devastating to wildlife populations which will be eliminated. Major impacts to reptiles, amphibians, mammals, and birds include loss of cover (for reproduction or escape) loss of food, species composition changes, decreased diversity, decreased density and numbers, and increased susceptibility to predators. Overall, this alternative would significantly damage fish and wildlife resources and their habitat.

We assume this alternative would eliminate the island, and vegetation on the island, located mid-channel near the eastern end of the Argentine levee. Please be aware that all islands on the Kansas River are the property of the State of Kansas and are held in thrust for the people by the Kansas Department of Wildlife and Parks (Department). Any alternative that would adversely affect the island or the variety of shallow water habitats associated with the island would have to be closely coordinated with the Department.

The shallow sand substrate of the Kansas River is much more conducive to some native fish than the fast, deep Missouri. Missouri River fishes use the lower Kansas River as a backwater providing refuge from high swift turbid flows of the channelized navigation channel of the mainstem. Shovel nose sturgeon are known to seek out these calmer waters, particularly during winter. The pallid sturgeon (Scaphirhynchus albus) is a moderately large bottom-dwelling fish which occurs in low numbers in portions of the Missouri River and may occur in the lower Kansas River, below Lawrence during high Kansas flow. Enlarging the cross-sectional area the lower Kansas River will likely result in a "may affect" determination for the pallid sturgeon, thereby requiring formal consultation pursuant to section 7 of the Endangered Species Act.

In compliance with the requirements of Section 7 (c) of the Act, a Biological Opinion on the Operation of the Missouri River Mainstem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project and the Operation of the Kansas River Reservoir System was issued by the Service in November of 2000. It is the Service's biological opinion that the Corp's proposed continued operation of the system and the cumulative effects, are likely to jeopardize the continued existence of the least tern, piping plover, and the pallid sturgeon, but not likely to jeopardize the continued existence of the bald eagle. The jeopardy opinion is still in effect for the Kansas River System. Additional adverse impacts to pallid sturgeon habitat at the mouth of the Kansas River would be problematic.

In 1980, potential recreation sites adjacent to the Kansas River were identified by the Heritage Conservation and Recreation Service (now the Park Service) as an element of the Kansas River Bank Stabilization Study. The plan proposes that the reach of the Kansas River beginning at its confluence with the Deleware River downstream to Interstate Highway 635 Bridge Crossing, a distance of 57 miles, be designated as a component of the National Wild and Scenic River System. The Plan proposed fee acquisition of 18 acres and easements on between 14 and 98 acres of land on the right bank of the river between the 635 bridge and Turner Bridge. This site was to become the downstream terminus or take out point for the recreational river segment. The western half of the Argentine Unit on the Kansas River encompasses this site. Any effort to modify or deepen the river in this area must be closely coordinated with the National Park Service.

The adverse effects to fish and wildlife and recreation from implementation of this alterative should be avoided by eliminating it from further consideration. Increasing the height of existing levees along the lower Kansas River will eliminate the need for removing large amounts of vegetation from stream banks and avoid the expense of maintenance required on channels dredged through noncohesive (sand substrate) materials. In addition, removal of riparian vegetation riverward of levees increases their risk of failure through breeching during floods based on a study of levee failures during the 1993 flood conducted by the University of Missouri.

MITIGATION DISCUSSION

To date, a formal habitat evaluation has not been conducted on habitats within the project area and none is deemed necessary.

The Service has established a mitigation policy used as guidance in determining resource categories and recommending mitigation (46 FR: 7644-7663). We have determined that most of the wildlife habitat that would be affected by the raising of existing levees and flood walls is in Resource Category No. 4" (habitats of medium to low value). For this category, loss of habitat value should be minimized.

Forested wetland and riparian woodland are consistent with Resource category No.2 that is, habitats are of high value that are relatively scarce or becoming scarce on a national or regional basis. Losses attributed to the project would require in-kind mitigation (replacement of habitat

value lost with equal habitat values of the same kind of habitat as those eliminated). The cost of mitigating habitat losses should be included as a project cost. The only area of potential impact is the borrow site where farmed wetlands may be present.

Whenever possible, we recommend upland trees within the construction right-of-way remain undisturbed. While trees are young now, they are closer to a mature and more valuable stage than newly established trees.

To minimize impacts to birds protected under the Migratory Bird Treaty Act, trees or other vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds during the general migratory bird nesting season of March through August. Disturbance of nesting areas should be avoided until nesting is completed. Vegetation clearing and construction related soil disturbances can cause sediment-laden runoff to enter waterways. To minimize impacts associated with erosion, contractors should employ silt curtains, coffer dams, dikes, straw bales or other suitable erosion control measures. Construction related petrochemical spills can also negatively impact fish and wildlife resources. Therefore, measures should be implemented prior to construction to minimize the likelihood of petrochemical spills.

Section 2 of the Fish and Wildlife Coordination Act requires the Service to identify project related opportunities to enhance fish and wildlife. The enhancement recommendations discussed below refer to project related creation of wildlife habitat, over and above that required to mitigate losses attributable to project construction.

The Corps should coordinate with the National Park Service and the Kansas Department of Wildlife and Parks to determine the need or desirability of an access road over Argentine Levee Unit in the vicinity of the 635 Bridge, the downstream terminus of the NRI segment of the Kansas River. Every effort should be made to preserve the native vegetation riverward of this levee unit.

Native trees, grasses and forbs, noted for their high wildlife value, could be established along the landward (where feasible) and stream side base of the existing levee system. This might help offset future losses due to increased encroachment along the rivers once flood protection is increased once again. Switch grass often takes longer to become fully established; however, when established, stand of native vegetation provide excellent soil binding characteristics, a valuable wildlife habitat and require fewer maintenance costs. The Service, Missouri Department of Conservation, the Kansas Department of Wildlife and Parks, and the Natural Resources Conservation Service offer assistance programs and could work with the cities of Kansas City to develop vegetation management plans.

The potential for aquatic and wetland restoration at Liberty Bend Cut-off should be explored in an effort to replenish this backwater area or restore (create) disconnected oxbow habitat.

RECOMMENDATIONS

In the interest of protecting fish and wildlife resources in the vicinity of the Kansas Cities local flood protection project area the following recommendations are provided.

1. Riparian and wetland habitats should be avoided to the maximum extent practicable when selecting borrow sites for the proposed levee raises and compensatory mitigation should be undertaken for unavoidable impacts.

2. Levees should be seeded with warm season grasses such as switch grass.

3. Removal of mature cottonwoods, and other native vegetation should be avoided where possible, and if they are removed, replace woody vegetation by establishing 2 acres of native vegetation for every acre impacted.

4. The Corps should create wetland mitigation habitat to compensate for the loss of wetland acreage from construction of the project. Because an, as yet, unknown number of acres of farmed wetland may be directly impacted, it may be necessary to restore non-wetland habitat to wetland habitat. Farmed wetlands should be mitigated at a 1.0 to 1.0 ratio.

5. Since channelization and levee construction have already resulted in dramatic loss of riparian and wetland habitats in the Missouri and Kansas River basins, the alternative to remove riparian vegetation to increase discharge capacity of the lower Kansas River should be dropped from further consideration.

The following recommendations describe opportunities to provide fish and wildlife enhancement through the project.

6. Encourage wetland development and hydrological re-connection to the river at existing borrow areas landward of the levee units.

7. Provide river access at the Argentine Levee segment.

8. Establish native vegetation (trees and shrubs) riverward of levee segments where riparian woodlands are sparse or nonexistent.

9. Potential for aquatic and wetland restoration at Liberty Bend Cot-off just downstream of Kansas City should be explored.

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January 4, 2006

Environmental Resources Section
Planning Branch

Mr. Michael LeValley
Field Supervisor, Kansas Field Office
U.S. Fish and Wildlife Service
315 Houston, Suite E
Manhattan, Kansas 66502

Dear Mr. LeValley:

The Corps of Engineers, Kansas City District (CENWK) received your draft Fish and Wildlife Coordination Act Report dated September 28, 2005, for the Kansas Citys, Missouri and Kansas, Flood Damage Reduction Feasibility Study and Environmental Impact Statement. Here are our comments in regards to the recommendations that your office provided:

1) Comment Noted. Impacts to natural resources including wetlands, islands, snags, riparian and upland trees will be avoided to the extent practicable. Compensatory mitigation will be undertaken for significant unavoidable resource impacts as needed.

2) Comment Noted. Levee seeding is conducted in accordance with the information provided in the operation and maintenance section within the "*Guidance For The Design And Construction Within The Critical Area Of Constructed Flood Control Projects*" (http://www.nwk.usace.army.mil/local_protection/guidance.html), MAINTENANCE Chapter, paragraph 2.2 to 2.2.10. The seeding requirements meet 33CFR 208.10 Part B section, Levee Maintenance. This requirement assures that levee slopes are mowed on a regular basis for close inspection of the slopes. Close inspection is required to detect settlement, sloughing, slope instability, erosion, the presence of burrowing animals, the presence of debris, encroachments that tend to weaken levees, rutting, depressions or other effects. Regular mowing also assures that deep-rooted vegetation will not become established on levee slopes. The use of switchgrass is not amenable for use on levee slopes meeting the above requirements.

3) Comment Noted. CENWK will mitigate unavoidable impacts to natural resources as appropriate.

4) Comment Noted. Mitigation for impacted wetlands will be conducted in accordance with the Corps requirements contained in Regulatory Guidance Letter No. 02-2, dated December 24, 2002.

5) Comment Noted. Kansas River tree removal has been removed from further consideration for Phase I alternatives. A levee raise is the current, preferred alternative for the Argentine levee unit to achieve flood damage reduction and to avoid and minimize impacts to riparian vegetation. Phase II alternatives are currently in the early stages of the alternatives formulation process.

6) Comment Noted. Opportunities for environmental measures will be considered in combination with any potential mitigation requirements.

7) Comment Noted. Providing river access at the Argentine levee segment or the construction of an access road over the Argentine unit is not anticipated to be a component of this project.

8) Comment Noted. No concentrated areas of tree clearing are anticipated as a result of project requirements. The feasibility of woody vegetation establishment will be determined with the consideration of flow conveyance requirements.

9) Comment Noted. Potential sites for fish and wildlife measures as part of mitigation requirements will include the Liberty Bend cut-off.

Additional, non-enumerated comments were noted within your draft Fish and Wildlife Coordination Act Report. In regards to state-listed species that may occur within the project area, county species lists have been obtained from the Kansas Department of Wildlife and Parks, and the Missouri Department of Conservation. Impacts to state-listed threatened and endangered species will be avoided to the extent practicable.

Areas slated for clearing and grubbing as a result of project requirements will be surveyed for the presence of nesting birds during the specified March through August timeframe.

Based upon our existing analysis, levee improvements to be conducted within the Argentine levee unit, which includes the segment of the Kansas River listed on the National Rivers Inventory, are not anticipated to compromise the potential for future designation of the Kansas River as a Wild and Scenic river.

Best Management Practices would be included within the project specifications to avoid and minimize erosion and petrochemical spills within construction areas. Erosion control measures may include silt fences, straw bales, and other suitable mechanisms. Measures utilized to prevent the loss of petrochemicals into waters of the U.S. would include the designation of staging areas for chemical storage away from streams, fueling heavy equipment away from streams, and the proper disposal of contractor generated waste.

Contractors would be required to submit an environmental protection plan prior to initiating construction activities.

In regards to the potential need of levee districts upstream and downstream of the Kansas City's project needing to conduct levee raises in response to a levee raise proposed for this project, recent detailed studies of the 1993 flood as it occurred in the Kansas City metropolitan area have established that the arrival of the peak flows from both the Kansas River and the upper Missouri River were almost coincidental.

A small increase in flood stage will not adversely affect the urban levees on the Missouri River in Kansas City, as these levees now provide a greater level of protection. The Missouri River agricultural levees downstream of Kansas City will be long overtopped before these extremely rare flood stages are realized, and the slight increase in stage occurs. The same is true for any agricultural levees along the lower Kansas River (Kansas Citys Review of Completed Works, in progress).

Another factor to consider is the fact that two of the lower Kansas River levees provide protection for a considerable urban population, mostly low income. People live behind these levees. Levee failure, particularly at the upstream end of the levees, could result in a significant loss of life.

Sincerely,

Christopher M. White, Ph. D.
Chief, Environmental Resources Section
Planning Branch

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Kansas Field Office
2609 Anderson Avenue
Manhattan, Kansas 66502-6172

May 3, 2006

Dr. Christopher M. White, Chief, Environmental Resources
Room 843
CENWK-PM-PR
U.S. Army Corps of Engineers
700 Federal Building
601 East 12th Street
Kansas City, MO 64106-2896

Dear Dr. White:

The U.S. Fish and Wildlife Service submits this supplemental letter to the Draft Fish and Wildlife Coordination Act Report (DCAR) dated September 2005 for the Kansas Cities, Missouri and Kansas Flood Damage Reduction Project - Kansas City, Missouri and Kansas City, Kansas project pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), and the fiscal year 2004 Scope-of-Work Agreement between the U.S. Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers, Kansas City District (Corps) for the Section 216, Local Flood Protection Feasibility Study, as requested by your office. The requests for the evaluations of additional alternatives were received on February 14, 2006 for the Argentine 500 +3 alternative, on February 16, 2006 for the Central Industrial District Levee and Armourdale Levee modifications, and on March 8, 2006 for the Argentine 500 +5 alternative. We received draft delineation maps dated 2003 for the CID and Armourdale levee modifications and a series of Proposed Area Footprint Mapping documents dated 27 April 2005 for the two Argentine alternatives.

The CID and Armourdale levee modifications are considered to be Phase 2 of the project and appear to involve earthen levee raises, floodwall raises, and underseepage improvement measures. However these units were not included in the Scope of Work (SOW) for this project. The FY 2004/2005 Scope of Work Impact Analysis for a Feasibility Study and Environmental Impact Statement, Kansas Citys, Missouri and Kansas, Flodd Damage Reduction Study, Missouri and Kansas Rivers Between the Kansas City District, Corps of Engineers and the U.S. Fish and Wildlife Service, Manhattan, KS states that the SOW for the "Armourdale and the Central Industrial Districts (CIDs) of Missouri and Kansas, is to be determined upon further evaluation." Due to this technicality and the limited information provided by the Corps concerning these modifications we feel that an evaluation at this time would be inappropriate and incomplete for inclusion in the Draft or Final Fish and Wildlife Coordination Act Report for this project. When

more definitive plans are developed, we will study the proposal and any alternatives and prepare more detailed comments and recommendations based upon the SOW prepared for this work.

This letter has been developed in cooperation with the Kansas Department of Wildlife and Parks and is submitted in accordance with the Fish and Wildlife coordination act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Missouri Department of Conservation has declined to review the supplemental letter to the Draft Fish and Wildlife Coordination Act Report. The Fish and Wildlife Service will provide a final Fish and Wildlife Coordination Act Report when a recommended plan has been selected.

GENERAL DESCRIPTION OF THE PROJECT AREA

To facilitate construction, management, and operation, the overall project was set up in seven units. The geographical units are: the Fairfax-Jersey Creek unit on the Missouri River in Kansas; the Argentine and Armourdale units on the Kansas River in Kansas; the Central Industrial District unit, which lies in both States and is bounded on the west by the Kansas River and on the north by the Missouri River; and three other units the North Kansas City, East Bottoms, and Birmingham units, all in Missouri. The design and construction of each of these units was coordinated with the others, yet each became effective as it was completed, and each is operationally independent. Complete effectiveness of the overall project is contingent upon adequate reservoir control in the upper Missouri and Kansas River Basins. Levees, floodwalls, relief wells, gravity drain structures, and pumping plants comprise the main protective structures. Other major elements include channel and floodway improvements in both rivers, bridge and approach alterations, and the Liberty Bend cutoff in the Missouri River immediately downstream from Kansas City.

The floodplains of the Kansas and Missouri Rivers at Kansas City are largely developed, but have bands of a riparian vegetation riverward of some levee units. The dominant trees in these riparian bands are cottonwood, willows, green ash, silver maple, boxelder and sycamore. The upland hillsides are occupied by grasses and oak-hickory forest associations. Because of the urban nature of the Kansas Cities, which has resulted in extensive development within the floodplain, the value of the remaining areas of native vegetation riverward of the levees is greatly enhanced. They appear as a string of habitat beads or pearls strung along the length of the river with an urban backdrop. The largest areas of native vegetation are riverward of the East Bottoms units in Missouri, and the Argentine and Fairfax-Jersey Creek Units in Kansas.

Areas of special note are east of the East Bottoms unit at the mouth of the Blue River and the area of Big Shoal Creek as it emerges from the bluff, passes around the northern end of the Birmingham Unit and enters the Liberty Bend Cut-off. Although small, the areas incorporate side channels, wetlands, and bottomland hardwoods. The areas retain some natural hydrology and some semblance of natural floodplain.

Aquatic and terrestrial resources and threatened and endangered species remain as described in the DCAR.

Evaluation of Alternatives Considered

Two additional alternatives were evaluated for the Argentine Unit. The Argentine 500 +3 and Argentine 500 +5 would consist primarily of landside raise along the majority of the levee. Information provided for the Argentine 500 +0, the original preferred alternative, stated that a two-foot increase would widen the base by 12 feet. For every mile of two-foot levee improvement, approximately, 1.5 acres of land on the landward side of the levee would be incorporated into the levee system. We assume that these proportions would remain the same for the two new alternatives. However, some areas of the levees would receive I-walls which would allow the levee to be heightened vertically without the corresponding horizontal increase in the base width. The 500 +3 alternative would increase the height of the levee approximately 2 - 6 feet, while the 500 +5 alternative would increase the height of the levee approximately 4 - 9 feet.

These increases in levee height will result in an increase in the amount of fill needed. To meet the need for additional fill, new borrow areas may be procured or borrow areas already identified may be expanded. The Corps has identified three wetlands that may be affected by the Argentine 500 +3 and 500 +5 alternatives. Two would be impacted from increases in the levee base width and the third is a farmed wetland present in a proposed borrow area. The increase in borrow areas may result in the discovery of additional impacts to wetlands. All wetland impacts should be mitigated in accordance with the mitigation recommendations contained in the DCAR.

Although the floodway cross section will remain essentially unchanged the heightened levees will force flood water to pass through the narrow funnel-like opening left by higher levees and floodwalls which line both sides of the river. This will cause flood crests to increase in height (the water has no place to go but up) and floodwaters will be impounded upstream. In 1993, the constricted Missouri River floodplain prevented the Kansas River from draining. This caused water to back up in the Kansas River, flooding far into the state of Kansas (White House Interagency Floodplain Management Review Committee, 1994). If Kansas City increases the height of its levees, upstream levees may need to be raise even higher with possible impacts to other river and floodplain habitat.

Riparian woodland (in various serial stages) is the only significant resource anticipated to be impacted by proposed flood control work in the Kansas City area. The Argentine 500 +3 and Argentine 500 +5 alternatives will likely result in an increase in water depth riverward of the levees and an increase in the length of time these areas are inundated during flood stages. This will likely cause changes in species composition and canopy cover in riparian areas. We expect that riparian species composition will decrease in diversity becoming ever more dominated by flood tolerant species and that the understory will also decrease. Canopy cover would be expected to decrease as the less water tolerant species die out, then increase and stabilize as the water tolerant species fill the void. The understory would likely be dominated by annual species.

Project construction of the Argentine Units would cause temporary, short-term impacts to fish and wildlife from noise, dust, and the presence of workers and machinery. Runoff from construction areas, access roads, staging areas and unprotected fills could degrade water quality

inside the levee system. Accidental spills of fuels, lubricants, hydraulic fluids and other petrochemicals would be harmful to aquatic life.

RECOMMENDATIONS

Since impacts to terrestrial and aquatic resources are presumed to remain essentially the same as the Argentine 500 +0 alternative we evaluated in the DCAR, our recommendations for fish and wildlife enhancement also remain essentially the same as in the DCAR.

1. Riparian and wetland habitats should be avoided to the maximum extent practicable when selecting borrow sites for the proposed levee raises and compensatory mitigation should be undertaken for unavoidable impacts.

2. Levees should be seeded with warm season grasses such as switch grass.

3. Removal of mature cottonwoods, and other native vegetation should be avoided where possible, and if they are removed, replace woody vegetation by establishing two acres of native vegetation for every acre impacted.

4. The Corps should create wetland mitigation habitat to compensate for the loss of wetland acreage from construction of the project. Removal of fill material from within the cropland area has the potential to cause the loss of farmed wetland. Farmed wetland should be delineated within borrow sites and should be avoided if possible. If an unavoidable loss is incurred, the quantity and quality of the farmed wetland will determine the amount of compensation necessary to offset project losses. The wetland mitigation plan would be developed in coordination with the Corps, EPA, and the Kansas Department of Wildlife and Parks. This plan would include site locations, time frames, construction plans, a monitoring plan, progress reports, and standards of success. This plan would be a condition of any permit issued for the project. The plan should be implemented regardless of whether impacted wetlands are classified as jurisdictional for purposes of the Clean Water Act..

The following recommendations describe opportunities to provide fish and wildlife enhancement through the project.

5. Encourage wetland development and hydrological reconnection to the river at existing borrow areas landward of the levee units.

6. The Corps should coordinate with the National Park Service and the Kansas Department of Wildlife and Parks to determine the need or desirability of an access road over the Argentine Levee Unit in the vicinity of the I-635 Bridge, the downstream terminus of the NRI segment of the Kansas River. Every effort should be made to preserve the native vegetation riverward of this levee unit.

7. Establish native vegetation (trees and shrubs) riverward of levee segments where riparian woodlands are sparse or nonexistent.

8. The potential for aquatic and wetland restoration at Liberty Bend Cut-off should be explored in an effort to replenish this backwater area or restore (create) disconnected oxbow habitat.

9. Native trees, grasses and forbs, noted for their high wildlife value, could be established along the landward (where feasible) and stream side base of the existing levee system. This might help offset future losses due to increased encroachment along the rivers once flood protection is increased once again. Switch grass often takes longer to become fully established; however, when established, stands of native vegetation provide excellent soil binding characteristics, a valuable wildlife habitat and require fewer maintenance costs. The Service, Missouri Department of Conservation, the Kansas Department of Wildlife and Parks, and the Natural Resources Conservation Service offer assistance programs and could work with the cities of Kansas City to develop vegetation management plans.

To minimize impacts to birds protected under the Migratory Bird Treaty Act, trees or other vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds during the general migratory bird nesting season of March through August. Disturbance of nesting areas should be avoided until nesting is completed. Vegetation clearing and construction related soil disturbances can cause sediment-laden runoff to enter waterways. To minimize impacts associated with erosion, contractors should employ silt curtains, coffer dams, dikes, straw bales or other suitable erosion control measures. Construction related petrochemical spills can also negatively impact fish and wildlife resources. Therefore, measures should be implemented prior to construction to minimize the likelihood of petrochemical spills.

Invasive species have been identified as a major factor in the decline of native flora and fauna and their ecosystems. Nearly half of the species currently listed as Threatened or Endangered under the U.S. Federal Endangered Species Act are considered to be at risk primarily because of competition with and predation by non-indigenous species (Nature Conservancy 1996; Wilcove et al. 1998). Human actions are the primary means of invasive species introductions. Prevention of introductions is the first and most cost-effective option for dealing with invasive species (Global Invasive Species Programme Toolkit). Executive order 13112 Section 2 (3) directs Federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere and to ensure that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. Therefore, we recommend that the following Best Management Practice (BMP) be implemented during construction of the levees.

> All equipment brought on site will be throughly washed to remove dirt, seeds and plant parts. Any equipment that has been in any body of water within the past 30 days will be thoroughly cleaned with hot water (hotter than 40° C or 104° F) and dried for a minimum of five days before being used at this project site. In addition, before transporting equipment from the project site all visible mud, plants, and fish/animals will be removed, all water will be eliminated, and the equipment will be throughly cleaned. Anything that came in contact with the water will be cleaned and dried following the above procedure.

Please feel free to call me at 785 539-3474 ext. 105 or Susan Blackford ext. 102, if you have any questions or if we can be of any further assistance with this project.

Sincerely,

Michael J. LeValley
Field Supervisor

cc: Kansas Department of Wildlife & Parks Environmental Services Section, Pratt, KS Attn: Jim Hays
U.S.F.W.S., Columbia Field Office, Ecological Services.
U.S.F.W.S., Federal Activities, Denver, CO Attn: Bob Dach
Missouri Department of Conservation, Jefferson, City, MO. Attn: Stuart Miller and Jane Epperson

MJL/shb

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, KANSAS CITY DISTRICT
700 FEDERAL BUILDING
601 E 12TH STREET
KANSAS CITY MO 64106-2896

REPLY TO
ATTENTION OF

May 23, 2006

Environmental Resources Section
Planning Branch

Mr. Michael LeValley
Field Supervisor, Kansas Field Office
U.S. Fish and Wildlife Service
315 Houston, Suite E
Manhattan, Kansas 66502

Dear Mr. LeValley:

The Corps of Engineers, Kansas City District (CENWK) received your supplemental letter to the Draft Fish and Wildlife Coordination Act Report dated September 28, 2005, for the Kansas Citys, Missouri and Kansas, Flood Damage Reduction Feasibility Study and Environmental Impact Statement. Here are our comments in regards to the recommendations that your office provided:

1) Comment Noted. Impacts to natural resources including wetlands, islands, snags, riparian and upland trees will be avoided to the extent practicable. Compensatory mitigation will be undertaken for significant unavoidable resource impacts as needed.

2) Comment Noted. Levee seeding is conducted in accordance with the information provided in the operation and maintenance section within the "*Guidance For The Design And Construction Within The Critical Area Of Constructed Flood Control Projects*" (http://www.nwk.usace.army.mil/local_protection/guidance.html), MAINTENANCE Chapter, paragraph 2.2 to 2.2.10. The seeding requirements meet 33CFR 208.10 Part B section, Levee Maintenance that requires levee slopes to be mowed on a regular basis for close inspection. Close inspection is required to detect settlement, sloughing, slope instability, erosion, the presence of burrowing animals, the presence of debris, encroachments that tend to weaken levees, rutting, depressions or other effects. Regular mowing also insures that deep-rooted vegetation will not become established on levee slopes. The use of switchgrass is not amenable for use on levee slopes meeting the above requirements.

3) Comment Noted. CENWK will mitigate unavoidable impacts to natural resources as appropriate.

4) Comment Noted. Mitigation for impacted wetlands will be conducted in accordance with the Corps requirements contained in Regulatory Guidance Letter No. 02-2, dated December 24, 2002.

5) Comment Noted. Opportunities for environmental measures will be considered in combination with any potential mitigation requirements.

6) Comment Noted. Providing river access at the Argentine levee segment or the construction of an access road over the Argentine unit is not anticipated to be a component of this project.

7) Comment Noted. The feasibility of woody vegetation establishment riverward of levee segments will be determined with the consideration of flow conveyance and levee maintenance requirements.

8) Comment Noted. Potential sites for fish and wildlife measures as part of mitigation requirements will include the Liberty Bend cut-off.

9) Comment Noted. Levees are seeded with vegetation that can be maintained through mowing for inspection of levee integrity. Trees are not generally desirable at the base of levees as woody vegetation may compromise levee integrity. The feasibility of woody vegetation establishment riverward of levee segments will be determined with the consideration of flow conveyance requirements.

Additional, non-enumerated comments were noted within your report. Areas slated for clearing and grubbing as a result of project requirements will be surveyed for the presence of nesting birds during the specified March through August timeframe. Best Management Practices would be included within the project specifications to avoid and minimize erosion and petrochemical spills within construction areas, and prevent the introduction of invasive species. Erosion control measures may include silt fences, straw bales, and other suitable mechanisms. Measures utilized to prevent the loss of petrochemicals into waters of the U.S. would include the designation of staging areas for chemical storage away from streams, fueling heavy equipment away from streams, and the proper disposal of contractor generated waste. Contractors will be required to submit an environmental protection plan prior to initiating construction activities.

Sincerely,

Christopher M. White, Ph. D.
Chief, Environmental Resources Section

Appendix D

Missouri Department of Conservation Natural Heritage Database Report for Clay and Jackson Counties, Missouri

Kansas Department of Wildlife and Parks State-Listed Threatened and Endangered Species in Wyandotte County, Kansas

Heritage database: Results for Clay county

Common Name	Scientific Name	state rank	global rank	state status	federal status
FLOATING FOXTAIL GRASS	ALOPECURUS AEQUALIS	S2	G5		
GREAT BLUE HERON Species Info.	ARDEA HERODIAS	S5	G5		
LAKE-BANK SEDGE	CAREX LACUSTRIS	S2	G5		
HIGHFIN CARPSUCKER Species Info.	CARPIODES VELIFER	S2	G4G5		
NORTHERN HARRIER Species Info.	CIRCUS CYANEUS	S1S2	G5	E	
	CREEKS AND SMALL RIVERS (PRAIRIE REGION)				
	DRY-MESIC FOREST				
GOLDIE'S FERN	DRYOPTERIS GOLDIANA	S2	G4		
GREAT PLAINS SKINK Species Info.	EUMECES OBSOLETUS	S2	G5		
	FRESHWATER MARSH				
PLAINS KILLIFISH Species Info.	FUNDULUS ZEBRINUS	S2	G5		
	MESIC FOREST				
	MESIC LIMESTONE/DOLOMITE FOREST				
PIED-BILLED GREBE Species Info.	PODILYMBUS PODICEPS	S2	G5		
SORA Species Info.	PORZANA CAROLINA	S2	G5		
PALLID STURGEON Species Info.	SCAPHIRHYNCHUS ALBUS	S1	G1G2	E	E
REGAL FRITILLARY	SPEYERIA IDALIA	S3	G3		*
PLAINS SPOTTED SKUNK	SPILOGALE PUTORIUS INTERRUPTA	S1	G5T4	E	*
OVAL LADIES' TRESSES	SPIRANTHES OVALIS VAR EROSTELLATA	S2	G5T?		

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Heritage database: Results for Jackson county

Common Name	Scientific Name	state rank	global rank	state status	federal status
AURICULATE FALSE FOXGLOVE	AGALINIS AURICULATA	S2	G3		*
GREAT BLUE HERON Species Info.	ARDEA HERODIAS	S5	G5		
	CREEKS AND SMALL RIVERS (PRAIRIE REGION)				
	DEEP MUCK FEN				
	DRY-MESIC LIMESTONE/DOLOMITE FOREST				
LITTLE BLUE HERON Species Info.	EGRETTA CAERULEA	S2	G5		
PEREGRINE FALCON Species Info.	FALCO PEREGRINUS	S1	G4	E	
	LIMESTONE GLADE				
BLACK-CROWNED NIGHT-HERON Species Info.	NYCTICORAX NYCTICORAX	S2	G5		
A BEARD-TONGUE	PENSTEMON COBAEA VAR COBAEA	S1	G4T?		
PIED-BILLED GREBE Species Info.	PODILYMBUS PODICEPS	S2	G5		
OVAL LADIES' TRESSES	SPIRANTHES OVALIS VAR EROSTELLATA	S2	G5T?		
BARN OWL Species Info.	TYTO ALBA	S2	G5	E	
ROCK ELM	ULMUS THOMASII	S2	G5		

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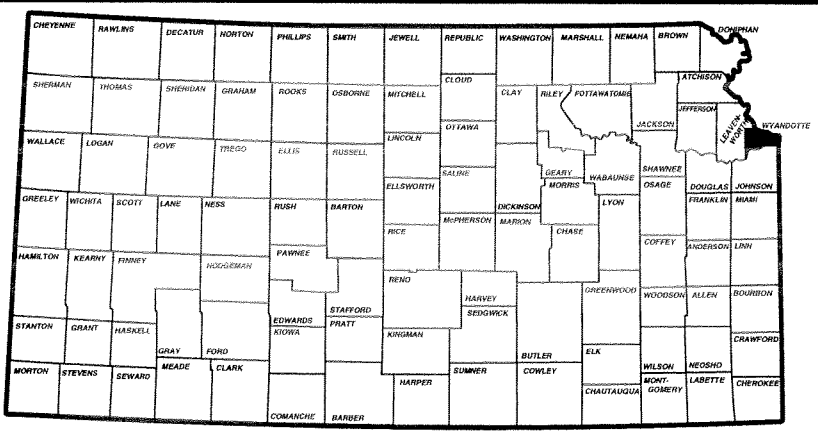
WYANDOTTE COUNTY

COUNTY LOCATOR MAP



STATUS KEY

THR = Threatened

END = Endangered

SNC = Species In Need of Conservation

CAN = Canidate Listing

NA = Not Applicatable

THREATENED & ENDANGERED (T&E)SPECIES

American Burying Beetle *Nicrophorus americanus*
State: END **Federal:** END **Critical Habitat:** NO

Bald Eagle *Haliaeetus leucocephalus*
State: THR **Federal:** THR **Critical Habitat:** YES

Chestnut Lamprey *Ichthyomyzon castaneus*
State: THR **Federal:** NA **Critical Habitat:** YES

Eastern Spotted Skunk *Spilogale putorius*
State: THR **Federal:** NA **Critical Habitat:** NO

Eskimo Curlew *Numenius borealis*
State: END **Federal:** END **Critical Habitat:** NO

Flathead Chub *Platygobio gracilis*
State: THR **Federal:** NA **Critical Habitat:** YES

Least Tern *Sterna antillarum*
State: END **Federal:** END **Critical Habitat:** YES

Pallid Sturgeon *Scaphirhynchus albus*
State: END **Federal:** END **Critical Habitat:** YES

Peregrine Falcon *Falco peregrinus*
State: END **Federal:** NA **Critical Habitat:** NO

Piping Plover *Charadrius melodus*
State: THR **Federal:** THR **Critical Habitat:** YES

Redbelly Snake *Storeria occipitomaculata*
State: THR **Federal:** NA **Critical Habitat:** YES

Sicklefin Chub *Macrhybopsis meeki*
State: END **Federal:** CAN **Critical Habitat:** YES

Silver Chub *Macrhybopsis storeriana*
State: END **Federal:** NA **Critical Habitat:** YES

Silverband Shiner *Notropis shumardi*
State: THR **Federal:** NA **Critical Habitat:** YES

Smooth Earth Snake *Virginia valeriae*
State: THR **Federal:** NA **Critical Habitat:** YES

Snowy Plover *Charadrius alexandrinus*
State: THR **Federal:** NA **Critical Habitat:** NO

Sturgeon Chub *Macrhybopsis gelida*
State: THR **Federal:** CAN **Critical Habitat:** YES

Western Silvery Minnow *Hybognathus argyritis*
State: THR **Federal:** NA **Critical Habitat:** YES

SPECIES IN NEED OF CONSERVATION (SINC)

Black Tern *Chlidonias niger*
State: SNC **Federal:** NA **Critical Habitat:** NA

Blue Sucker *Cycleptus elongatus*
State: SNC **Federal:** NA **Critical Habitat:** NA

Bobolink *Dolichonyx oryzivorus*
State: SNC **Federal:** NA **Critical Habitat:** NA

Brassy Minnow *Hybognathus hankinsoni*
State: SNC **Federal:** NA **Critical Habitat:** NA

Cerulean Warbler *Dendroica cerulea*
State: SNC **Federal:** NA **Critical Habitat:** NA

Eastern Hognose Snake *Heterodon platirhinos*
State: SNC **Federal:** NA **Critical Habitat:** NA

Ferruginous Hawk *Buteo regalis*
State: SNC **Federal:** NA **Critical Habitat:** NA

Golden Eagle *Aquila chrysaetos*
State: SNC **Federal:** NA **Critical Habitat:** NA

Plains Minnow *Hybognathus placitus*
State: SNC **Federal:** NA **Critical Habitat:** NA

River Shiner *Notropis blennius*
State: SNC **Federal:** NA **Critical Habitat:** NA

Short-eared Owl *Asio flammeus*
State: SNC **Federal:** NA **Critical Habitat:** NA

Southern Flying Squirrel *Glaucomys volans*
State: SNC **Federal:** NA **Critical Habitat:** NA

Timber Rattlesnake *Crotalus horridus*
State: SNC **Federal:** NA **Critical Habitat:** NA

Whip-poor-will *Camprimulgus vociferus*
State: SNC **Federal:** NA **Critical Habitat:** NA

Yellow-throated Warbler *Dendroica dominica*
State: SNC **Federal:** NA **Critical Habitat:** NA

U.S. Army Corps of Engineers, Kansas City District

Appendix E

Common Mammals, Birds, Amphibians, Reptiles and Fish of the Project Area

Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement

Appendix E

Common Mammals, Birds, Amphibians, Reptiles and Fish of the Project Area

Common mammals that may be found in the study area include:

white-tailed deer (*Odocoileus virginianus*)
opossum (*Didelphis marsupialis*)
cottontail rabbit (*Sylvilagus floridanus*)
beaver (*Castor canadense*)
striped skunk (*Mephitis mephitus*)
plains pocket gopher (*Geomys bursarius*)
least shrew (*Cryptotis parva*)
eastern wood rat (*Neotoma floridana*)
big brown bat (*Eptesicus fuscus*)
meadow jumping mouse (*Zapus hudsonius*)
woodland white-footed mouse (*Peromyscus leucopus*)
plains harvest mouse (*Reithrodontomys montanus*)
western harvest mouse (*Reithrodontomys megalotis*)
prairie white-footed mouse (*Peromyscus maniculatus*)
thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*)
coyote (*Canis latrans*)
raccoon (*Procyon lotor*)
muskrat (*Ondatra zibethica*)
badger (*Taxidea taxus*)
fox squirrel (*Sciurus niger*)
little brown bat (*Myotis lucifugus*)
hoary bat (*Lasiurus cinereus*)
eastern mole (*Scalopus aquaticus*)

Common resident or migrant birds that may be found in the study area include:

great blue heron (*Ardea heordias*)
green heron (*Butorides virescens*)
blue-winged teal (*Anas discors*)
wood duck (*Aix sponsa*)
mallard (*Anas platyrhynchos*)
red-tailed hawk (*Buteo jamaicensis*)
black-eyed chickadee (*Parus atricapillus*)
tufted titmouse (*Parus bicolor*)
starling (*Sturnus vulgaris*)
American kestrel (*Falco sparverius*)
turkey vulture (*Cathartes aura*)
house sparrow (*Passer domesticus*)
robin (*Turdus migratorius*)
western meadowlark (*Sturnella neglecta*)
red-winged blackbird (*Agelaius phoeniceus*)
common grackle (*Quiscalus quiscula*)
Harris' sparrow (*Zonotrichia querula*)
tree sparrow (*Spizella arborea*)
chipping sparrow (*Spizella passerina*)
belted kingfisher (*Ceryle alcyon*)
whip-poor-will (*Caprimulgus vociferus*)
western kingbird (*Tyrannus verticalis*)
horned lark (*Cremophilia alpestris*)
blue jay (*Cyanocitta cristata*)
purple martin (*Progne subis*)
rock dove (*Columba livia*)
barred owl (*Strix varia*)
common crow (*Corvus brachyrhynchos*)
warbling vireo (*Vireo gilvus*)
yellow-breasted chat (*Decteria virens*)
bobwhite quail (*Colinus virginianus*)
morning dove (*Zenaida macroura*)
field sparrow (*Spizella pusilla*)
American coot (*Fulica americana*)
killdeer (*Charadrius vociferus*)
spotted sandpiper (*Actitis macularia*)
great horned owl (*Bubo virginianus*)

Appendix E – continued (Birds)

screech owl (*Otus asie*)
common night hawk (*Chordeiles minor*)
red-bellied woodpecker (*Centurus carolinus*)
red-headed woodpecker (*Melanerpes erythrocephalus*)
house wren (*Troglodytes aedon*)
eastern wild turkey (*Meleagris gallopovo*)
brown thrasher (*Toxostoma rufum*)

Common reptiles that may be found in the study area include:

snapping turtle (*Chelydra serpentine*)
ornate box turtle (*Terrapene ornata*)
painted turtle (*Chrysemys picta*)
smooth soft-shelled turtle (*Apalone mutica*)
spiny soft-shelled turtle (*Apalone spinifera*)
common five lined skink (*Eumeces fasciatus*)
ground skink (*Scincella lateralis*)
black rat snake (*Elaphe obsoleta*)
western slender glass lizard (*Ophisaurus attenuatus*)
prairie ringnecked snake (*Diadophis punctatus*)
Eastern hog-nosed snake (*Heterodon platyrhinos*)
Eastern yellow-bellied racer (*Coluber constrictor*)
bullsnake (*Pituophis melanoleucus*)
prairie king snake (*Diadophis punctatus arnyi*)
diamond backed water snake (*Nerodia rhombifer*)
red-sided garter snake (*Thamnophis sirtalis*)
copperhead (*Agkistrodon contortrix*)

Common amphibians that may be found in the study area include:

tiger salamander (*Ambystoma tigrinum*)
bullfrog (*Rana catesbeiana*)
leopard frog (*Rana pipiens*)
Blanchard's cricket frog (*Acris crepitans*)
plains spadefoot toad (*Scapahiopus bombifrons*)
western chorus frog (*Pseudacris triseriata*)
Woodhouse's toad (*Bufo woodhousei*)
plains leopard frog (*Rana blairi*)

Appendix E – continued

Principal fish species of the Lower Kansas and Missouri Rivers at Kansas City:

channel catfish (*Ictalurus punctatus*)*
gizzard shad (*Dorsoma cepadianum*)*
shortnose gar (*Lepisosteus platostomus*)*
carp (*Cyprinus carpio*)*
goldeye (*Hiodon alosoides*)
sand shiner (*Notropis ludibundus*)
freshwater drum (*Aplodinotus grunniens*)
black bullhead (*Ameiurus melas*)
bigmouth buffalo (*Ictiobus cyprinellus*)
smallmouth buffalo (*Ictiobus bubalus*)*
shovelnose sturgeon (*Scaphirhynchus platorhynchus*)
shorthead redhorse (*Moxostoma macrolepidotum*)
blue catfish (*Ictalurus furcatus*)
flathead catfish (*Pylodictis olivaris*)
longnose gar (*Aplodinotus grunniens)*
bluegill (*Lepomis macrochirus*)
fathead minnow (*Pimephales promelas*)
white crappie (*Pomoxis annularis*)
quillback (*Carpiodes cyprinus*)
river carpsucker (*Carpiodes carpio*)*
walleye (*Stizostedion vitreum*)
green sunfish (*Lepomis cyanellus*)

*Dominant species

U.S. Army Corps of Engineers, Kansas City District

Appendix F

Common Trees, Shrubs and Grasses within the Study Area

Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement

Appendix F

Trees, Shrubs and Grasses within the Study Area

Predominant tree species found on the project lands include:

honey locust (*Gliditsia triacanthos*)
sycamore (*Platanus occidentalis*)
black walnut (*Juglans nigra*)
green ash (*Fraxinus pennsylvanica*)
chinkapin oak (*Quercus muehlenbergii*)
eastern cottonwood (*Populus deltoides*)
hackberry (*Celtis occidentalis*)
eastern red cedar (*Juniperus virginiana*)
box elder (*Acer negundo*)
osage-orange (*Maclura pomifera*)
slippery elm (*Ulmus rubra*)
red mulberry (*Morus rubra*)
black willow (*Salix nigra*)
white mulberry (*Morus alba*)
shingle oak (*Quercus imbricaria*)
silver maple (*Acer saccharinum*)

Deciduous shrubs on the project lands include:

rough leaf dogwood (*Cornus drummondii*)
buckbrush (*Symphoricarpos orbiculatus*)
elderberry (*Sambucus canadensis*)
fragrant sumac (*Rhus aromatica*)
Japanese honeysuckle (*Lonicera japonica*)
smooth sumac (*Rhus glabra*)
gooseberry (*Ribes missouriense*)
poison ivy (*Toxicodendron radicans*)
prairie rose (*Rosa arkansana*)

Grass cover on the project lands include:

Kentucky bluegrass (*Poa pratensis*)
Virginia wild rye (Elymus canadensis)
switchgrass (*Panicum virgatum*)
K-31 Fescue (*Festuca elatior*)
domestic ryegrass (*Elymus multiflorum*)
foxtail grass (*Setaria* spp.)
Johnson grass (*Sorghum halepense*)
domestic ryegrass (*Lolium perenna*)
smooth brome (*Bromus inermis*)
cheatgrass (*Bromus tectorum*)

U.S. Army Corps of Engineers, Kansas City District

Appendix G

Cultural Resource CoordinationION

Kansas Citys, Missouri and Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement

KANSAS

05-04023

Kansas State Historical Society
Jennie Chinn, *Executive Director*

KATHLEEN SEBELIUS, GOVERNOR

April 15, 2005

Timothy Meade
US Army COE
Kansas City District
700 Federal Bldg
Kansas City MO 64106-2896

RE: Argentine Levee Improvements in Kansas City, KS
Wyandotte County

Dear Mr. Meade:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ex. 214). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Christy Davis
Deputy State Historic Preservation Officer

CD/cg

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext. 205 • Fax 785-272-8682 • Email jchinn@kshs.org • TTY 785-272-8683
www.kshs.org

KANSAS

KSR&C No. 06-04-041

Kansas State Historical Society
Cultural Resources Division

KATHLEEN SEBELIUS, GOVERNOR

April 12, 2006

Timothy Meade
Cultural Resource Manager
Dept of the Army
Kansas City District COE
700 Federal Bldg
Kansas City MO 64106-2896

RE: Kansas River Levee Improvements – Armourdale Levee Unit
Wyandotte County

Dear Mr. Meade:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Tim Weston 785-272-8681 (ex. 214). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Timothy Weston for

Patrick Zollner
Deputy State Historic Preservation Officer

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext. 240 • Fax 785-272-8682 • TTY 785-272-8683
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KANSAS

KSR&C No. 06-04-04

Kansas State Historical Society
Cultural Resources Division

KATHLEEN SEBELIUS, GOVERNOR

April 12, 2006

Timothy Meade
Cultural Resource Manager
Dept of the Army
Kansas City District COE
700 Federal Bldg
Kansas City MO 64106-2896

RE: Kansas River Levee Improvements – Central Industrial (CID) Levee Unit
Wyandotte County

Dear Mr. Meade:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Tim Weston 785-272-8681 (ex. 214). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Timothy L Weston for

Patrick Zollner
Deputy State Historic Preservation Officer

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www.kshs.org

KANSAS

KSR&C No. 04-10-126

Kansas State Historical Society
Dick Pankratz, *Director, Cultural Resources Division*

KATHLEEN SEBELIUS, GOVERNOR

December 7, 2004

Christopher M White PhD
Chief, Environmental Resources Section
Department of the Army
Kansas City District COE
700 Federal Building
Kansas City MO 64106-2896

RE: Argentine Levee Improvements – Borrow Activity
Wyandotte County

Dear Mr. White:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ex. 214) or Jennifer Epperson (ex. 225). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Richard Pankratz, Director
Cultural Resources Division

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext. 217 • Fax 785-272-8682 • Email dpankratz@kshs.org • TTY 785-272-8683
www.kshs.org

CULTURAL RESOURCE ASSESSMENT
Section 106 Review

CONTACT PERSON/ADDRESS

Timothy Meade
Cultural Resources Manager
Corps of Engineers, Kansas City District
700 Federal Building
Kansas City, Missouri 64106-2896

C:

Joe Cothern, EPA

PROJECT:

East Bottoms Unit Flood Protection System Improvements

FEDERAL AGENCY

COE

COUNTY:

JACKSON

The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:

☐ After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

☒ Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

☐ An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.

By: Mark A. Miles — June 8, 2005

Mark A. Miles, Deputy State Historic Preservation Officer — Date

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
P.O. Box 176, Jefferson City, Missouri 65102

For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number:
111-JA-05

KANSAS

KSR&C No. 05-03-140

Kansas State Historical Society
Jennie Chinn, *Executive Director*

KATHLEEN SEBELIUS, GOVERNOR

March 24, 2005

Christopher M White PhD
Chief, Environmental Resources Section
Department of the Army
Kansas City District COE
700 Federal Building
Kansas City MO 64106-2896

RE: Fairfax/BPU Floodwall Improvements
Wyandotte County

Dear Mr. White:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ex. 214). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

William E. Banks
for

Christy Davis
Deputy State Historic Preservation Officer

CD/cg

6425 SW Sixth Avenue • Topeka, KS 66615-1099
Phone 785-272-8681 Ext: 205 • Fax 785-272-8682 • Email jchinn@kshs.org • TTY 785-272-8683
www.kshs.org

KANSAS

KSR&C No 05-03-137

Kansas State Historical Society
Jennie Chinn, *Executive Director*

KATHLEEN SEBELIUS, GOVERNOR

March 24, 2005

Timothy Meade
Cultural Resource Manager
Department of the Army
Kansas City District COE
700 Federal Building
Kansas City MO 64106-2896

RE: Improvements to Jersey Creek Sheet Pile Wall
Wyandotte County

Dear Mr. Meade:

The Kansas State Historic Preservation Office has reviewed its cultural resources files for the area of the above referenced project in accordance with 36 CFR 800. The project as proposed should have no effect on properties listed on the National Register of Historic Places or otherwise identified in our files. This office has no objection to implementation of the project.

Any changes to the project area that include additional ground disturbing activities will need to be reviewed by this office prior to beginning construction. If construction work uncovers buried archeological materials, work should cease in the area of the discovery and this office should be notified immediately.

This information is provided at your request to assist you in identifying historic properties, as specified in 36 CFR 800 for Section 106 consultation procedures. If you have questions or need additional information regarding these comments, please contact Will Banks 785-272-8681 (ex. 214). Please refer to the Kansas Review & Compliance number (KSR&C#) above on all future correspondence relating to this project.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

William E. Banks

Christy Davis for
Deputy State Historic Preservation Officer

CD/cg

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CULTURAL RESOURCE ASSESSMENT
Section 106 Review

CONTACT PERSON/ADDRESS

Timothy Meade
Cultural Resources Manager
Corps of Engineers, Kansas City District
700 Federal Building
Kansas City, Missouri 64106-2896

C:

Joe Cothern, EPA

PROJECT:

North Kansas City Levee Unit, Harlem Section

FEDERAL AGENCY

COE

COUNTY:

CLAY

The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:

☐ After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

☒ Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

☐ An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.

By: Mark A. Miles — June 8, 2005
Mark A. Miles, Deputy State Historic Preservation Officer — Date

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
P.O. Box 176, Jefferson City, Missouri 65102
For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number:
025-CL-05

CULTURAL RESOURCE ASSESSMENT
Section 106 Review

CONTACT PERSON/ADDRESS

Timothy Meade
Cultural Resources Manager
Corps of Engineers, Kansas City District
700 Federal Building
Kansas City, Missouri 64106-2896

C:

Joe Cothern, EPA

PROJECT:

North Kansas City Levee Unit at National Starch Site

FEDERAL AGENCY

COE

COUNTY:

CLAY

The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:

☐ After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

☒ Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

☐ An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.

By: Mark A Miles — May 27, 2005

Mark A. Miles, Deputy State Historic Preservation Officer — Date

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
P.O. Box 176, Jefferson City, Missouri 65102
For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number: 021CL05-H128

US Army Corps of Engineers, Kansas City District

Appendix H

Section 404 of the Clean Water Act Compliance Review Documents (Public Notice/Draft 404(b)(1) Evaluation)

DRAFT
PUBLIC NOTICE

US Army Corps
of Engineers
Kansas City District

Permit No.
Issue Date: June 2, 2006
Expiration Date: July 17, 2006

45-Day Notice

JOINT PUBLIC NOTICE: This public notice is issued jointly with the Kansas Department of Health and Environment. The Department of Health and Environment will use the comments to this notice in deciding whether to grant Section 401 water quality certification. Commenters are requested to furnish a copy of their comments to the Kansas Department of Health and Environment, Bureau of Water – Watershed Management Section, 1000 SW Jackson Street, Suite 420, Topeka, Kansas 66612-1367.

APPLICANT: Kansas City District, Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

PROJECT LOCATION (As shown on the attached drawings): The existing levee system protects areas in the Cities of Kansas City, North Kansas City and Birmingham, Jackson and Clay Counties, Missouri, and in the City of Kansas City, Wyandotte County, KS.

AUTHORITY: Section 404 of the Clean Water Act (33 USC 1344). The U.S. Army Corps of Engineers, Kansas City District, at the request and with the cooperation of the five distinct non-Federal sponsors of the seven levee units in the Kansas City metropolitan area, has undertaken this study of the Kansas Citys, Missouri and Kansas, Flood Damage Reduction Study, Missouri and Kansas Rivers. The Corps is undertaking this study under the authority of Section 216 of the 1970 Flood Control Act.

ACTIVITY (As shown on the attached drawings): The purpose of this study is to determine whether one or more plans for improving the level of flood damage reduction reliability is technically viable, economically feasible, and environmentally acceptable, or if no action is warranted. Failure of any part of the existing flood damage reduction system during a major flood would have significant adverse impacts on the human environment including property damage and potential loss of human life. Considering these potential significant impacts on the human environment, and in accordance with the National Environmental Policy Act, the Corps initiated preparation of a Draft Feasibility Report and Draft

Environmental Impact Statement (DFR/DEIS). This Draft Interim Feasibility Report (DIFR) and DEIS presents an analysis of several alternatives considered during scoping and a detailed analysis of each levee unit to determine what action, or if any action, is warranted to minimize the potential loss of human life and property damage related to failure of the levee system in the event of a major flood. Proposed alternatives identified to improve flood damage reduction reliability include: Levee raise with pump station modifications or replacement to include floodwalls, stoplog gaps, top caps, and rock toes; pressure relief wells; floodwall modification using buttresses; new sheetpile wall; buried collector system; and the no action alternative. This DFR/DEIS identifies a combination of the alternative listed above as the Corps' Preferred Alternatives, and presents a detailed study of the environmental impacts associated with each of the alternatives listed above.

WETLANDS: A jurisdictional wetlands determination concluded that 3 wetlands would be affected by the proposed project for a total impact of 0.2 acres.

CULTURAL RESOURCES: The proposed project has been reviewed in compliance with the National Historic Preservation Act of 1966 (Public Law 89-665) including a check of the National Register of Historic Places and supplements thereto and coordination has been completed with the Kansas State and Missouri State Historic Preservation Officers (SHPO). No archeological sites or historical structures will be impacted by the proposed project. No properties listed or proposed for listing in the National Register were identified in the project area.

ENDANGERED SPECIES: Four Federally-listed threatened or endangered species and two species that are candidates for listing are dependent on the Missouri and Kansas Rivers and their floodplains in the study area (Wyandotte County in Kansas, and Platte, Clay, and Jackson Counties in Missouri). In compliance with the Endangered Species Act, a preliminary determination has been made that the described work will not affect species designated as threatened or endangered or adversely affect critical habitat. The U.S. Fish and Wildlife Service (FWS), in a Draft Fish and Wildlife Coordination Act Report and supplemental letter, stated that the proposed project area would not have an adverse impact to federally listed threatened and endangered species.

FLOODPLAINS: This activity is being reviewed in accordance with Executive Order 11988, Floodplain Management, which discourages direct or indirect support of floodplain development whenever there is a practicable alternative. By this public notice, comments are requested from individuals and agencies that believe the described work will adversely impact the floodplain.

WATER QUALITY CERTIFICATION: Section 401 of the Clean Water Act (33 USC 1341) requires that all discharges of dredged or fill material must be certified by the appropriate state agency as complying with applicable effluent limitations and water quality standards. This public notice serves as an application to the state in which the discharge site is located for certification of the discharge. The discharge must be certified before Department of the Army authorization can be issued. Certification, if issued, expresses the state's opinion that the discharge will not violate applicable water quality standards.

PUBLIC INTEREST REVIEW: The decision to issue authorization will be based on an evaluation of the probable impact including the cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The

benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, esthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people. The evaluation of the impact of the activity on the public interest will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency under authority of Section 404(b) of the Clean Water Act (33 USC 1344). The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny an authorization for this proposal. To make this decision, comments are used to address impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in preparation of an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity. In addition, the comments will be used to address the draft Feasibility Study.

COMMENTS: This notice is provided to outline details of the above-described activity so this District may consider all pertinent comments prior to determining if issuance of an authorization would be in the public interest. Any interested party is invited to submit to this office written facts or objections relative to the activity on or before the public notice expiration date. Comments both favorable and unfavorable will be accepted and made a part of the record and will receive full consideration in determining whether it would be in the public interest to issue the Department of the Army authorization. Copies of all comments, including names and addresses of commenters, may be provided to the applicant. Comments should be mailed to the address shown on page 1 of this public notice.

PUBLIC HEARING: Any person may request, in writing, prior to the expiration date of this public notice, that a public hearing be held to consider this application. Such requests shall state, with particularity, the reasons for holding a public hearing.

ADDITIONAL INFORMATION: This Draft Feasibility Report (DIFR) and DEIS has been prepared by KCD concerning the proposed flood damage reduction measures of the Kansas City Levees Project. This report may be obtained by writing to the applicant address above, **Attn: CENWK-PM-PF, Chief, Formulation Section; or by calling the Environmental Section Chief, Dr. Chris White at 816-389-3158 Christopher.m.white@usace.army.mil** Additional information about this Section 404 Public Notice may be obtained by contacting Mr. Richard Skinker at 816-389-3134 (Fax 816-389-2025).

The review of this Public Notice, Draft Environmental Impact Statement and Draft Feasibility Report are being conducted concurrently to incorporate appropriate comments in the same document.

NOTICE TO EDITORS: This notice is provided as background information for your use in formatting news stories. This notice is not a contract for classified display advertising.

CENWK-OD-R (1145-b) 24 May 2006

MEMORANDUM FOR Chief, Environmental Resources Section (PM-PR)

SUBJECT: Request for OD-R review of the Kansas City Levees Feasibility Study for Maintenance Activities on the Argentine, Armourdale, Birmingham, Central Industrial District, East Bottoms, Fairfax-Jersey Creek and North Kansas City levee units.

1. The Regulatory Branch (OD-R) has reviewed the information furnished and concurs with the wetland assessment, with the compensatory wetland mitigation proposal and with the compliance with Section 404(b)(1) guidelines.

2. The wetland fills associated with the widening of the levee base is authorized by Nationwide Permit No. 3 and the construction of the outfall structure a the National Starch site is authorized by Nationwide Permit No. 7.

3. Any questions concerning the information furnished should be directed to Douglas R. Berka at 816-389-3657 (FAX 816-389-2032).

3 Encls

Joseph S. Hughes
Chief, Regulatory Branch
Operations Division

APPENDIX H

DRAFT

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION (40 CFR 230)

KANSAS CITYS LEVEES FEASIBILITY STUDY
AND ENVIRONMENTAL IMPACT STATEMENT

TABLE OF CONTENTS

APPENDIX H

DRAFT

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION (40 CFR 230)

KANSAS CITYS LEVEES FEASIBILITY STUDY
AND ENVIRONMENTAL IMPACT STATEMENT

PROJECT DESCRIPTION

a. Location. The project area consists of the seven levee units that provide flood protection for areas in Kansas City, North Kansas City and Birmingham, Jackson and Clay Counties, Missouri and in Kansas City, and Wyandotte County, Kansas. The levee units include the Argentine, Armourdale, Birmingham, Central Industrial District (CID), East Bottoms, Fairfax-Jersey Creek, and the North Kansas City unit. The protective works primarily consist of levees, floodwalls, bridge and approach alterations, and channel improvements over the lower 9.5 miles of the Kansas River and on the Missouri River from 6.5 miles upstream to 9.5 miles downstream of the mouth of the Kansas River. The 32-square-mile protected area covers the heavily industrialized floodplains of the two rivers.

b. General Description. The existing flood protection measures incorporated into each levee unit were engineered to provide the appropriate type of overtopping and/or underseepage control for effective system reliability. The overtopping and underseepage control measures present within the existing levee units include earthen levees and berms, floodwalls, sheetpile walls, pressure relief wells, buried collector systems, and pump stations. Combinations of these features are present within some of the levee units as determined appropriate by engineering studies to provide the most effective overtopping and underseepage flood protection. The locations of the proposed work within each unit are variable and dependent on the location of existing flood protection features and observations from previous flood events.

The preferred alternatives for each of the Missouri levee units and the Argentine unit in Kansas are the National Economic Development (NED) plans, which provide the greatest net benefits to the public. The tentative preferred alternative for the Armourdale and Central Industrial District levee units is the nominal 500-year+3 levee raise and underseepage controls to provide equitable protection for the Kansas units. Preferred alternatives and tentative preferred alternatives are discussed below.

MISSOURI RIVER

East Bottoms: The preferred alternative for the East Bottoms unit is the installation of pressure relief wells. Relief wells would be installed along the landside toe of the levee between stations 405+00 and 420+00. This alternative is an augmentation to an existing collector system.

Fairfax-Jersey Creek Board of Public Utilities (BPU) Floodwall: The preferred alternative for the BPU floodwall is to construct an additional row of piles and a foundation slab extension to strengthen the existing floodwall. An additional row of auger cast piles would be installed on the landward side of the pile cap. A foundation slab extension would be implemented to facilitate pile installation. Additional piles and the slab extension would be installed the entire length of the existing floodwall between stations 287+85 and 302+32.

Fairfax-Jersey Creek Sheetpile Wall: The preferred alternative for the Fairfax-Jersey Creek Sheetpile Wall is the installation of an open cell sheetpile wall landside of the existing floodwall. Sheetpile would be driven by a crane into the existing stability berm between stations 23+30 and 29+99.

North Kansas City-Harlem: The preferred alternative for the North Kansas City, Harlem area is a buried collector system. An underground water collection system consisting of perforated pipe would be installed the full length of the levee between stations 212+00 to 239+40 along the landside toe to intercept seepage. Six manholes would be placed along the system to collect seepwater. Portable pumps would be used to pump seepwater back over the levee during high water events.

North Kansas City-National Starch: The preferred alternative for the National Starch site in North Kansas City consists of relief well installation and pump station construction. Pressure relief wells and a pump station would be installed into the existing stability berm landward of the existing levee between stations 255+95 and 274+10. The area of surface excavation for a rock-lined conveyance path, if constructed, would measure approximately 325 feet X 50 feet (0.37 acres).

KANSAS RIVER

Argentine: The preferred alternative for the Argentine unit is the nominal 500-year+3 levee raise and underseepage improvements including buried collector, relief well, stability berm, underseepage berm, and filter blanket construction. Two stoplogs would be raised. The levee raise would be accomplished by constructing earthen levee and floodwalls.

Armourdale: Preliminary levee raise alternatives proposed for this unit include the nominal 500-year+0, 500-year+1, 500-year+2, and 500-year+3. A preferred alternative for this unit has not been identified. The tentative preferred alternative for the Armourdale unit is the nominal 500-year+3 levee raise, which includes underseepage control measures and stabililty berm requirements. The raise would include increasing the height of the existing earthen levee with additional earthen levee or floodwall atop the existing levee. Existing floodwalls would be either removed or replaced, or new floodwall would be constructed landside of existing floodwall. In addition to earthen levee and floodwalls, this raise includes pump plant modification and/or replacement, and the installation of relief wells or a buried collector system to relieve underseepage pressures. Borrow soil would be placed primarily landward of the existing levee and floodwall to facilitate the levee improvements.

Central Industrial District: Preliminary levee raise alternatives for the Central Industrial District unit (CID) include the nominal 500-year+0, 500-year+1, 500-year+2, and 500-year+3. A preferred alternative for this unit has not been identified. The tentative preferred alternative for this unit is the nominal 500-year+3 levee raise, which includes pump plant, relief well, and buried collector construction to provide underseepage control. The levee raise would include increasing the height of the existing earthen levee and most likely, new floodwall would be constructed landside of existing floodwall instead of a complete removal and replacement of the floodwalls. Borrow soil would be placed primarily landward of the existing levee and floodwall to facilitate the levee improvements.

c. Authority and Purpose. The Kansas Citys project is a unit of the Missouri River basin comprehensive plan authorized by the 1936, 1944, 1946 and 1954 Flood Control Acts that provides local flood protection for the metropolitan areas of Kansas City, Missouri and Kansas City, Kansas. This study is being conducted under the authority provided by Section 216 of the 1970 Flood Control Act. This Act provides authority to reexamine completed civil works projects. Section 216 reads as follows:

> "*The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects, the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying structures or their operation, and for improving the quality of the environment in the overall public interest.*"

Section 216 of the 1970 Flood Control Act provided continuing authority to examine completed Federal projects to determine whether the projects are providing benefits as intended. The results of this examination indicate that increasing the level of protection provided by the Kansas Citys system may be technically and economically feasible without unacceptable environmental or social impacts. Accordingly, a Federal interest exists in designing and constructing improvements because of the potential to benefit the National economy.

d. General Description of Fill Material. The soils mapped within the proposed borrow area include the Haynie, Eudora, and Sarpy soil series. Exploratory soil borings were conducted in January 2005. The boring logs document an impervious soil layer consisting of silts and clays extending up to six feet below the surface followed by sandy aquifer. The central part of the borrow area has a thin layer of sand at the surface, varying between 1 and 4.5 feet in thickness, followed by 3 to 4 feet of silts and clay, on top of the sandy aquifer. Soil boring logs are located at the end of this document. The total quantity of material estimated to be removed from the proposed borrow site located within the Kansas River floodplain on the left bank between approximate river miles 11 and 13 is 725,919 bank cubic yards (bcy).

The rock used to construct the conveyance path at the National Starch site would be in conformance with the guidelines provided in the "slope protection" section within the "*Guidance For The Design And Construction Within The Critical Area Of Constructed Flood Control Projects*" (http://www.nwk.usace.army.mil/local_protection/guidance.html), MAINTENANCE

Chapter. It is most likely that 6-inches of bedding will be placed below 18 inches of rip-rap comprised of 200 pound stones of Burlington limestone. The rock would be sound, durable stone, free of cracks, seams, shale parting, and overburden soil, and approximately rectangular in cross shape. Deleterious substances in rock, which include soft, friable particles, rock fines (3-inches and smaller); objectionable materials and other foreign matter would not exceed 5%.

e. Description of the Proposed Fill Placement Sites.

KANSAS RIVER

Argentine Unit. Borrow soil would be placed within the floodplain of the Kansas River on the left bank between approximate river miles 10.1 and 4.7 to facilitate an earthen levee raise and the construction of underseepage control measures within the Argentine unit. Site visits and examination of National Wetland Inventory maps of the project area revealed that two palustrine emergent wetlands would be impacted by the proposed levee raise. The total area of these wetlands measuring approximately 0.027 acres would be filled.

Proposed Borrow Area. Soil would be removed from the floodplain of the Kansas River on the left bank between approximate river miles 11 and 13. A farmed wetland measuring about 0.17 acres would likely be either excavated, or otherwise impacted by borrow activities.

MISSOURI RIVER

North Kansas City Unit-National Starch site. The area of potential proposed fill at the National Starch site is located within the floodplain of the Missouri River on the left bank between approximate Missouri River miles 364.9 and 365.2. This area is comprised of riparian vegetation. It is currently undetermined if a conveyance path would be constructed to return Missouri River water that seeps through the levee back into the Missouri River. Trees within an area measuring about 0.37 acres would be cleared to facilitate conveyance path construction. A small amount of rock used to line the conveyance path may inadvertently enter the Missouri River.

f. Description of Disposal Method. Materials would be placed at the fill site by mechanical means. Equipment would be standard earthmoving construction equipment.

1. REVIEW OF COMPLIANCE (§230.10[A]-[D])

A review of the proposed activity indicates that:

a. The proposed fill placement occurs in a special aquatic site. The activity associated with the fill placement must have direct access or proximity to, or be located in, the aquatic ecosystem to fulfill its basic purpose.

b. The activity does not appear to (1) violate applicable state water quality or effluent standards (401 Water Quality Certification is pending); (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary.

c. The activity will not cause or contribute to significant degradation of water of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, or economic values.

d. Appropriate and practicable steps would be taken to minimize potential adverse impacts of the borrow placement on the aquatic ecosystem.

2. TECHNICAL EVALUATION FACTORS (SUBPARTS C-F)

a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

1. Substrate impacts. The substrate is considered to be hydric soils.
2. Suspended particulates/turbidity impacts. Fill activities associated with the levee project are not expected to produce any significant change in suspended particulate matter or turbidity for the Missouri River, Kansas River, Blue River, or other drainages located in the project area. No noticeable impacts to dissolved oxygen levels, toxic metals, organics or pathogens would be anticipated. Photosynthetic, filter feeder, and sight feeder impacts are expected to be minimal.
3. Water column impacts. Water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients, and eutrophication would not be significantly affected by the project.
4. Alteration of current patterns and water circulation. No adverse effects to current patterns or water circulation were identified.
5. Alteration of normal water fluctuations/hydroperiod. No adverse effects to normal water fluctuations/hydroperiod were identified.
6. Alteration of salinity gradients. Salinity determinations are not applicable to the area.

b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)

1. Effect on threatened/endangered species and their habitat. Four Federally-listed threatened or endangered species were reported by the USFWS as dependent on the Missouri and Kansas Rivers and their floodplains within the study area: the threatened bald eagle (*Haliaeetus leucocephalus*), threatened piping plover (*Charadrius melodus*), endangered least tern (*Sterna antillarum*) and endangered pallid sturgeon (*Scaphirhynchus albus*). Threatened or endangered species are discussed in the preceding Environmental Impact Statement (Section 3, Affected Environment, subparagraph 3.2.5, Threatened and Endangered Species and Section 4, Environmental Consequences, subparagraphs 4.14.1 through 4.14.9). It has been determined that there would be no impacts to federally listed species or their critical habitats as a result of this project.
2. Effect on the aquatic food web. The proposed actions should have no significant effect on the aquatic food web. No significant impacts to benthos, plankton, or nekton are anticipated. Disruption to fish and aquatic life would be minimal to non-existent because these species occur in the Missouri, Kansas, and Blue Rivers, which

would not be significantly affected by the selected plan.

3. Effect on wildlife (mammals, birds, reptiles, and amphibians). The proposed project features primarily impact riparian and wetland habitat, which are proposed to be replaced. The riparian vegetation and wetlands are the habitat types of value to area wildlife. It is anticipated that wildlife habitat will not significantly change as a result of the proposed action. The existing wetlands are considered marginal in habitat value, as they are relatively small and dominated by nuisance species that form dense monocultures and inhibit plant diversity. Both wetlands contain cattails (*Typha* sp.) and one wetland contains reed canarygrass (*Phalaris arundinaceae*).

c. Special Aquatic Sites (Subpart E)

1. Sanctuaries.
2. Wetlands.
3. Mud flats.
4. Vegetated shallows.
5. Coral reefs.
6. Riffle and pool complexes.

The proposed action would have no adverse effect on sanctuaries; mud flats; vegetated shallows; or riffle and pool complexes. An evaluation of impacts to coral reefs is not applicable to this project.

The proposed levee and borrow areas would directly impact approximately 0.27 acres of emergent wetland and 0.17 acres of farmed wetland.

d. Human Use Characteristics (Subpart F)

1. Effects on municipal and private water supplies
2. Recreational and commercial fisheries impacts
3. Effects on water related recreation
4. Aesthetic impacts
5. Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.

The proposed action would have no substantial adverse effect on municipal and private water supplies; recreational or commercial fisheries; or water-related recreation, national historic monuments, or similar preserves. Kaw Point Park was constructed in part with Land and Water Conservation Act funds. A conversion of use park use is not anticipated from the construction of the Fairfax-Jersey Creek sheetpile wall, located upstream of the Park. Sheetpile wall construction is estimated between 6 and 9 months. A waiver would be sought if the construction sheetpile wall would exceed twelve months. Aesthetics would be primarily impacted by increased levee heightening and secondarily by underseepage control features.

3. EVALUATION OF FILL MATERIAL (SUBPART G)

a. The following information has been considered in evaluating the biological availability of possible contaminants in fill material: physical characteristics. Fill material would be obtained primarily from one borrow site located west of the project area, within the Kansas River floodplain. Construction material would be chemically stable and noncontaminating. Construction would take place adjacent to areas with contaminated soil, but not within areas of known contaminated soil. Neither the fill nor its placement would cause relocation or increases of contaminants in the aquatic system. Certification of the project under Section 401 of the Clean Water Act would be received from the Missouri Department of Natural Resources.

b. Exploratory soil borings and chemical analysis sampling was conducted in January 2005. Grab samples for volatile organic compounds (VOCs) and composite samples for metals, pesticides, herbicides, and semivolatile organic compounds (SVOCs). All parameters tested were below action levels.

4. FILL PLACEMENT SITE DELINEATION (§230.11[F])

a. The following factors, as appropriate, have been considered in evaluating the disposal site: depth of water at the disposal site, current velocity, direction, variability at disposal site, and the degree of turbulence. The sites have also been evaluated for the presence of special aquatic sites and waters of the U.S.

b. Mixing Zone Determination: An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are appropriate.

5. ACTIONS TO MINIMIZE ADVERSE EFFECTS (SUBPART H)

All appropriate and practicable steps, as warranted, would be taken through application of recommendations of §230.70-230.77 to insure minimal adverse effects of the proposed fill placement. These actions include the following:

a. In order to minimize and/or avoid adverse effects on the aquatic ecosystem, the Corps will minimize impacts to riparian timber to the extent practicable and use uncontaminated fill material. Disturbed areas will be graded and seeded upon completion of shaping. All activities will comply with standard Corps measures, directives, and policies to insure environmental protection during construction and minimize construction-related pollution. The following lists some of the environmental protection measures and policies.

    (1) Temporary erosion control measures (silt fences, berms, dikes, drains, etc.) will be provided and maintained.

    (2) KCD will obtain an NPDES permit from KDHE and MDNR for stormwater discharges from the project's construction work areas. All requirements of the NPDES stormwater discharge permit received from these agencies will be incorporated into project plans and specifications.

(3) Wastewater would not be allowed to re-enter the Missouri, Kansas, or Blue Rivers or their tributaries.

(4) If necessary, contaminated ground will be excavated; disposed of in compliance with applicable city/state/Federal regulations; replaced with suitable fill material; finished with topsoil; and seeded.

(5) Dust will be reduced in work areas by sprinkling with water or other methods that are permitted to reduce hazard and nuisance.

(6) Contractors will employ machinery of appropriate size for the fill placement activities.

b. Impacts to 185 acres of riparian vegetation along the Kansas River were avoided by foregoing the channel clearing and tree removal alternatives proposed. However, two emergent wetlands will be filled to facilitate an earthen levee raise. Minimization of impacts to riparian vegetation would be accomplished by using structures, primarily floodwalls, to achieve levee heightening in combination with earthen berms or without earthen berms. A draft wetland mitigation plan is in preparation and is discussed briefly below. Details of the mitigation plan are pending.

c. To replace 0.027 acres of emergent wetland and 0.17 acres of farmed wetland that would be impacted by the project, the location, hydrology, form and depth of the existing wetlands would be similar to replace the functions provided by the impacted wetlands. There is a limited amount of real estate for wetland mitigation in the highly urbanized and industrialized project area, and much of the open land adjacent to the rivers within the project area is known to have hazardous waste concerns. It is proposed to mitigate emergent wetland impacts at a 1.5:1 ratio and farmed wetlands at a 1.0:1 ratio, and establish 0.21 acres of wetland just landward of the levee toe where hydrology is provided by runoff from the adjacent levee slope. The existing wetland vegetation is comprised of cattails and reed canarygrass, which are known to result in monocultures and may prevent the establishment of additional wetland plant species. Wetland vegetation consisting of sedges (*Carex*), smartweed (*Polygonum*), or other appropriate species would be established within the mitigated wetland.

d. The area of riparian habitat anticipated to be impacted by the proposed construction would total approximately 0.38 acres. About 0.37 of this acreage is attributed to the potential tree clearing adjacent to the National Starch site that would be required to construct a seepwater conveyance path. About 0.01 acres of additional riparian impact would result from removing individual trees for construction. Tree replacement would be conducted at a 2.0:1 ratio and consist of planting bare root seedlings of native bottomland, hardwood tree species or shrubs or seedlings of the riparian species impacted on 8-foot centers within the Argentine foreshore or other suitable spacing or location within, or adjacent to the project area. If the proposed total acreage of trees to be replaced cannot be established within a single location due to a lack of available real estate, individual trees or small groups of trees

would be planted where space is available within, or adjacent to the project area.

6. FACTUAL DETERMINATIONS (§230.11)

A review of the appropriate information as identified in items 2-5 above indicates that there is minimal potential for short-term or long term environmental effects of the proposed fill placement as related to: a. Physical substrate disposal site; Water circulation, fluctuation, and salinity; c. Suspended particulates/turbidity; d. Contaminant availability; e. Aquatic ecosystem structure and function; f. Disposal site; and

g. Determination of Cumulative Impacts on the Aquatic Ecosystem. No short-term or long-term environmental effects of the proposed fill as related to substantial cumulative impacts are expected. Impacts from construction would be minor and temporary. Impacts to natural resources were avoided or otherwise, minimized. Approximately 185 acres of riparian vegetation, considered a high value habitat by the USFWS in their draft Coordination Act Report (CAR), along the Argentine foreshore, was avoided by selecting the nominal 500-year+3 levee raise over the tree clearing and/or channel modification. However, the preferred levee raise requires filling two emergent wetlands. One farmed wetland will either be excavated or otherwise impacted by borrow activities. The draft plan for replacing wetlands that could not be avoided and replanting trees is discussed above.

   The borrow soil used in levee construction would be composed of chemically stable, noncontaminating material. Therefore, no detrimental cumulative or secondary impacts are expected to occur.

h. Determination of Secondary Impacts on the Aquatic Ecosystem. No short-term or long-term environmental effects of the proposed fill placement as related to secondary impacts are expected. Regarding E.0 11988, Flood Plain Management, there is limited very limited land available for development, and some available acreage has hazardous waste issues. The project entails increasing the reliability of the existing system as opposed to new levee construction. Therefore, secondary impacts to wetlands from future development pressures should not occur. Any development that would occur in the project area would be subject to Clean Water Act regulations and subject to an evaluation for consideration of a Section 404 permit. Actions initiated by the local sponsors that are not included in this project are not considered secondary impacts of the project. The local sponsor would be required to obtain a Section 404 permit prior to the discharge of dredged or fill material for their respective projects.

LOG OF BORING AD-528

US Army Corps of Engineers ®
Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-528
LOCATION: Kansas and Missouri
COORDINATES: N 14190735.79, E 1141877.29 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

LABORATORY DATA

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	USCS SYMBOL	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC INDEX PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
0							CLAY HARD DRY BROWN frozen				29.2	VG5	
0.5												VG5	
0.8													
							GRAVELLY COBBLES MODERATELY HARD GREY decomposed rock	CL	29	8		VG1	
2													
							LEAN CLAY MEDIUM DAMP - MOIST DARK BROWN						
4								CL	39	19	25	VG1	
4.6													
							FINE SAND LOOSE - MEDIUM COMPACT DRY LIGHT BROWN					VG3	
6													
8													
8.4													
							SILT LOOSE DRY GREY					VG2	
10													
10.0													
							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug						

LEGEND

- Fill (made ground)
- USCS Low Plasticity Clay
- USCS Poorly-graded Sand
- USCS Silt

OTHER LAB DATA: S: Minus 200 Sieve (%); U: Unconfined Compressive Strength (tsf); C: Confining Pressure (psi); F: Failure Strain (%); T: Total Sulfates; P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML; VG3 - SP; VG5 - FILL

LOG_A_2005 KANSAS-CITY-LEVEES.GPJ 4/1/05

LOG OF BORING AD-529

US Army Corps of Engineers ®

Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-529
LOCATION: Kansas and Missouri
COORDINATES: N 14192413.68, E 1142543.89 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND
0							FINE SAND FROZEN DARK BROWN 1.0	
2							FINE SAND LOOSE DRY BROWN 3.0	
4							CLAYEY SAND MEDIUM COMPACT DAMP-MOIST DARK BROWN 4.5	
6							CLAY SOFT DAMP DARK BROWN very silty 6.0	
8							FINE SAND LOOSE-MEDIUM DRY-DAMP LIGHT BROWN silty 10.0	USCS Silty Sand USCS Poorly-graded Sand USCS Clayey Sand USCS Low Plasticity Clay
10							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug	

LABORATORY DATA

USCS SYMBOL	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC INDEX (PI)	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
			27.5	VG4	
				VG3	
SC	27	10	21.2	VG4	
			24.9	VG1	
				VG3	

OTHER LAB DATA: S: Minus 200 Sieve (%); U: Unconfined Compressive Strength (tsf); C: Confining Pressure (psi); F: Failure Strain (%); T: Total Sulfates; P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG3 - SP; VG4 - SM

LOG_A_2005 KANSAS-CITY-LEVEES.GPJ 4/1/05

LOG OF BORING AD-530

US Army Corps of Engineers ®

Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-530
LOCATION: Kansas and Missouri
COORDINATES: N 14192416.14, E 1143534.5 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/12/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND
0							SILTY SAND FROZEN DARK BROWN	
							1.0 fine grained	
							1.5 FINE SAND LOOSE DRY-DAMP BROWN	
2							2.5 poorly graded SILT MEDIUM COMPACT DAMP DARK BROWN	
4							4.3 SILT MEDIUM COMPACT LIGHT BROWN SILT MEDIUM COMPACT DAMP GRAYISH BROWN sandy wet zone	
6							8.0	USCS Silty Sand USCS Poorly-graded Sand USCS Silt
8							SILTY SAND MEDIUM COMPACT DAMP LIGHT BROWN laminated fine grained	
10							10.0 Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug	

LABORATORY DATA

USCS SYMBOL	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
				VG4	
			4	VG3	
			20	VG2	
			11	VG2	
			25	VG2	
				VG4	

OTHER LAB DATA
S: Minus 200 Sieve (%)
U: Unconfined Compressive Strength (tsf)
C: Confining Pressure (psi)
F: Failure Strain (%)
T: Total Sulfates
P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG2 - ML; VG3 - SP; VG4 - SM

LOG_A_2005 KANSAS-CITY-LEVEES.GPJ 4/1/05

LOG OF BORING AD-531

US Army Corps of Engineers ®
Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-531
LOCATION: Kansas and Missouri
COORDINATES: N 14193052.59, E 1144847.77 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND
0							SILTY SAND FROZEN LIGHT BROWN very fine grained	
1.0							LEAN CLAY SOFT-VERY SOFT DAMP DARK BROWN very silty ~ 30-40 % silt	
2								
3.5							SILT LOOSE DRY BROWN with fine sand	
4.0							SILT MEDIUM COMPACT DAMP BROWN slightly sandy ~ 10-15 % very fine sand	
4								
6								
6.5							FINE SAND MEDIUM COMPACT - LOOSE DAMP-DRY LIGHT BROWN	
8								
10								
10.0							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug	

USCS Silty Sand
USCS Low Plasticity Clay
USCS Silt
USCS Poorly-graded Sand

LABORATORY DATA

USCS SYMBOL	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC INDEX PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
			14	VG4	
			22	VG1	
				VG2	
			25	VG2	
				VG3	

OTHER LAB DATA: S: Minus 200 Sieve (%); U: Unconfined Compressive Strength (tsf); C: Confining Pressure (psi); F: Failure Strain (%); T: Total Sulfates; P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML; VG3 - SP; VG4 - SM

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LOG OF BORING AD-532

US Army Corps of Engineers

Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-532
LOCATION: Kansas and Missouri
COORDINATES: N 14192422.33, E 1144971.11 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % ROD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND
0							LEAN CLAY MEDIUM MOIST DARK BROWN frozen to 1.0 ft	
4							4.3	
6							LEAN CLAY MEDIUM MOIST-WET DARK BROWN silty	
8							6.3	
10							SILT MEDIUM COMPACT DRY-DAMP LIGHT BROWN sandy	USCS Low Plasticity Clay USCS Silt
							10.0	
							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug	

LABORATORY DATA

USCS SYMBOL	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC INDEX PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
			26	VG1	
			31	VG1	
				VG2	

OTHER LAB DATA
S: Minus 200 Sieve (%)
U: Unconfined Compressive Strength (tsf)
C: Confining Pressure (psi)
F: Failure Strain (%)
T: Total Sulfates
P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML

LOG_A_2005 KANSAS-CITY-LEVEES.GPJ 4/1/05

LOG OF BORING AD-533

US Army Corps of Engineers ®

Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-533
LOCATION: Kansas and Missouri
COORDINATES: N 14193066.09, E 1145518.24 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist: Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

LABORATORY DATA

OTHER LAB DATA

S: Minus 200 Sieve (%)
U: Unconfined Compressive Strength (tsf)
C: Confining Pressure (psi)
F: Failure Strain (%)
T: Total Sulfates
P: Soil pH

DEPTH (ft)	DESCRIPTION OF STRATUM	LEGEND	USCS SYMBOL	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
0	LEAN CLAY MEDIUM DAMP DARK BROWN silty					19	VG1	
2.3								
2	SILT MEDIUM COMPACT DRY-DAMP LIGHT BROWN with fine-grained sand					10	VG2	
4.3								
4	SILT MEDIUM COMPACT DRY-DAMP BROWN with very fine-grained sand					15	VG2	
6.0								
6	LEAN CLAY MEDIUM MOIST DARK BROWN with silt					26	VG1	
8.0								
8	SILT MEDIUM COMPACT DRY-DAMP LIGHT BROWN with very fine-grained sand						VG2	
10.0								
10	Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug							

USCS Low Plasticity Clay

USCS Silt

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML

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LOG OF BORING AD-534

US Army Corps of Engineers ®
Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-534
LOCATION: Kansas and Missouri
COORDINATES: N 14192405.24, E 1145517.16 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/19/05 - 1/19/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

LABORATORY DATA

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND	USCS SYMBOL	ATTERBERG LIMITS LIQUID LIMIT LL	ATTERBERG LIMITS PLASTIC INDEX PI	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
0							LEAN CLAY MEDIUM DAMP DARK BROWN silty					26	VG1	
4.0							SILT MEDIUM COMPACT WET DARK BROWN clayey					31	VG2	
6.0							LEAN CLAY					35	VG6	
6.5							SOFT MOIST-WET DARK BROWN silty					28	VG1	
7.0							LEAN CLAY MEDIUM MOIST-WET DARK BROWN silty	USCS Low Plasticity Clay USCS Silt				16	VG2	
10							SILT MEDIUM COMPACT DRY-DAMP LIGHT BROWN with very fine-grained sand							
10.0							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug							

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML; VG6 - CL(LL=47,PI=28)

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LOG OF BORING AD-535

US Army Corps of Engineers ®

Department of the Army
Kansas City District
Corps of Engineers
700 Federal Building
Kansas City, MO 64106

INSTALLATION: Kansas City, Seven Levees
PROJECT: Argentine Levee Unit-Borrow Area
BORING NUMBER: AD-535
LOCATION: Kansas and Missouri
COORDINATES: N 14193402.93, E 1146504.01 ; NAD 83 UTM 15N feet
ELEVATION: 0.0 (ft)
DATE(S) DRILLED: 1/18/05 - 1/18/05

FIELD DATA

DRILLING METHOD(S): Diedrich D-90, 3 3/4" ID hollow stem auger, 3" ID inner barrel sampler

Driller: Mike Cooney Geologist:Jennifer Denzer

GROUNDWATER INFORMATION:
No water encountered during drilling or after. Dry 1/19/05

▽ Water Level during drilling ▼ Water level after drilling

DEPTH (ft)	SOIL SYMBOL	BREAKS: bb or mb	SAMPLE/DRILL METHOD	BLOWS	T: TORVANE KG/CM SQ	RC: % RQD: % Additional Field Data	DESCRIPTION OF STRATUM	LEGEND
0							LEAN CLAY SOFT DAMP DARK BROWN silty ~ 10-15% silt	
4.5							LEAN CLAY MEDIUM WET DARK BROWN silty	
7.5							SILT MEDIUM COMPACT DAMP LIGHT BROWN with very fine-grained sand	USCS Low Plasticity Clay USCS Silt USCS Poorly-graded Sand
8.5							FINE SAND LOOSE DRY LIGHT BROWN poorly graded	
9.5							SILT MEDIUM COMPACT DAMP-MOIST BROWN sandy	
10.0							Bottom of hole - No Refusal Backfilled to surface with cuttings and 3 bags Holeplug	

LABORATORY DATA

USCS SYMBOL	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC INDEX (PI)	MOISTURE CONTENT (%)	VG=Visual Grouping FC=Field Classification	OTHER LAB DATA
CL	47	28	20	VG6	
CL	47	28			
			30	VG1	
				VG2	
				VG3	
				VG2	

OTHER LAB DATA
S: Minus 200 Sieve (%)
U: Unconfined Compressive Strength (tsf)
C: Confining Pressure (psi)
F: Failure Strain (%)
T: Total Sulfates
P: Soil pH

R: BLOW COUNT REFUSAL = >50 blows/1/2 foot for SPT, > 100 blows for drive barrel
T - TORVANE EQUALLY SPACED ALONG SAMPLE
RC - ROCK CORE RECOVERY
RQD - ROCK QUALITY DESIGNATION

REMARKS: Coordinates Trimble Hand GPS
VG1 - CL(LL=39,PI=19); VG2 - ML; VG3 - SP; VG6 - CL(LL=47,PI=28)

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U.S. Army Corps of Engineers, Kansas City District

Figures

Kansas Citys, Missouri & Kansas
Flood Damage Reduction Study
Draft Environmental Impact Statement